MARINE REVIEW

VOL. XIX. Published every Thursday at 418-19 Perry-Payne Bldg., by the Marine Review Pub. Co. CLEVELAND, O., JUNE 22, 1899. Entered at Cleveland Postoffice as second class matter. No. 25

BATH-BUILT CRAFT.

CREDITABLE TRIAL OF COL. O. H. PAYNE'S STEAM YACHT APHRODITE—LAUNCH OF THE UNITED STATES TRAINING VESSEL CHESAPEAKE.

The magnificent steam yacht Aphrodite, which is proclaimed by all who have had the pleasure of seeing her to be the finest ocean-going steam yacht afloat, was given a speed test by her owner, Col. Oliver H. Payne of New York, last week. The Aphrodite was built by the Bath Iron Works of Bath, Me., the builders guaranteeing a speed of at least 15 knots under natural draft. On the official trial the yacht made 16.9 knots, but last week with a new wheel the Aphrodite made 17¼ knots in dead water on Long Island Sound, with only 120 revolutions a minute and under natural draft. This is a remarkable performance and it proves without doubt that she is just what her builders claimed she would be—the fastest pleasure craft of her type afloat. Under forced draft she will undoubtedly be able to show her heels to any sea-going vessel of her length. The Aphrodite is a rebuke to the American millionaires who have recently contracted for large steam yachts abroad. The Clyde turns out some splendid steam pleasure craft, but no designer or ship building firm in the world has as yet produced a vessel that is superior in any respect to the Aphrodite. She is handsome, yachty and ship shape, well proportioned, beautifully modeled, staunch and strongly constructed, and her interior finish is rich, luxurious and pleasing throughout. She has greater speed under natural draft than any of the modern Watson yachts of her size and type have under forced draft.

Last Tuesday morning, June 20, the United States training vessel Chesapeake was successfully launched from the yard of her builders, the Bath Iron Works, of Bath, Me. The Chesapeake is the first sheathed vessel built in this country and the only sailing vessel that has been built for the United States navy since the sixties. She is the twelfth vessel that the Bath Iron Works has launched for the United States government, and this firm has five other vessels for the United States navy on the stocks in various stages of construction. The Chesapeake is being built for the naval cadets at Annapolis. She is a sailing training vessel in every sense of the word. She is full ship rigged and has no steam whatever for propulsion purposes. The craft was christened by Miss Elise Bradford, daughter of Rear Admiral Bradford, chief of the bureau of equipment at Washington, D. C. The launching was witnessed by a large gathering of people and many noted guests from Annapolis and Washington were present. The Chesapeake is of the following dimensions: Length over all, 225 feet; length on load water line, 175 feet; beam, extreme, 37 feet; draught, 16 feet 6 inches; displacement, 1,200 tons. She has three continuous decks, namely, berth deck, gun deck and spar deck, with a small monkey forecastle forward. Her main armament consists of six 4-inch rapid fire guns. She will spread all told 20,000 square feet of canvas. The arrangement and fittings of the craft are all that can be desired. Although not by any means a handsome craft, the Chesapeake will undoubtedly prove a comfortable, seaworthy and very staunch vessel. She will accommodate 180 cadets, who will have an admirable chance to learn the ropes, etc., a neglected branch in the new navy. The Bath Iron Works has about completed all the work required by their contract, and the Chesapeake will be towed to Boston and delivered to the government without delay. The vessel will be rigged at the Charleston navy yard.

CARGO RECORDS—FREIGHT CARRIERS OF THE GREAT LAKES.

The Wilson line steamer Henry W. Oliver is proving by long odds the largest freight carrier among the steam vessels of the great lakes and will undoubtedly hold first place until the 500-foot Wolvin steamers that are to be built at Lorain go into commission next spring. The largest of the steel tow barges in the ore trade are, of course, carrying more than the Oliver, but they have only 200 or 300 tons the best of her. On 17 feet 9 inches draught, she brought down from Lake Superior, a few days ago, 6,731 gross tons of ore. This includes the 1 per cent. allowed for moisture in the ore and is equal to 7,539 net tons. It is expected that if given opportunity to load deep in the trade between Escanaba and South Chicago, instead of being confined to a little less than 18 feet draught in the St. Mary's and Detroit rivers, the Oliver would move full 7,000 gross tons. Cargo records corrected to date are: Iron ore—steel tow barge John A. Roebling, owned by the Bessemer Steamship Co. of Cleveland, 7,023 gross or 7,866 net tons, Duluth to Conneaut, draught of 17 feet 6 inches; barge John Fritz, owned by Bessemer Steamship Co., Cleveland, 6,960 gross or 7,795 net tons, Duluth to Conneaut; steamer Superior City, owned by A. B. Wolvin of Duluth, 6,823 gross or 7,642 net tons, between Escanaba and South Chicago on deep draught; steamer Henry W. Oliver, Wilson Transit Co. of Cleveland, 6,731 gross, or 7,539 net tons, Duluth to Cleveland on draught of 17 feet 9 inches.

Grain—Steamer Superior City, owned by A. B. Wolvin of Duluth, 266,550 bushels of corn, equal to 7,463 net tons, South Chicago to Owen Sound, draught of 18 feet 2 inches; steamer Superior City, owned by A. B. Wolvin of Duluth, 200,000 bushels of wheat and 41,800 bushels of flax, equal to 7,175 net tons, Duluth to Buffalo, mean draught of 17 feet 3 inches; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 332,100 bushels of oats, equal to 5,313 net tons, Manitowoc to Buffalo.

Coal—Steamer Hendrick S. Holden, Capt. John Mitchell and others, Cleveland, 6,432 net tons of anthracite, Buffalo to Duluth on a draught of 17 feet 8 inches forward and 17 feet 1 inch aft.

Repairs are to be made at Montague, Mich., on the engine of the wrecked steamer St. Lawrence.

GREAT LAKES REGISTER.

The main office of the Great Lakes Register has been removed from the Royal Insurance building, Chicago, to 320-322 Perry-Payne building, Cleveland. The Cleveland offices will be in full working order within a few days. Capt. F. D. Herriman, surveyor general, and his entire office staff, are to be permanently located in Cleveland. "This step has been taken after mature deliberation," says Capt. Herriman, "and there are several reasons underlying it. It is my desire to prove conclusively to the ship owners that there is no insurance influence whatever connected with the register. The work has from the beginning been based entirely upon the principles of the best classification societies of the world, but in order to remove even the thought that our surroundings in Chicago were in any way a disadvantage, this change has been made. There are other reasons, of course, notably the fact that Cleveland is more centrally located on the lakes, and as more tonnage is owned here than in Chicago, we will be enabled to come into close rela tions with the shipowners."

To supervise the construction of ships for the owners is one of the duties which the Great Lakes Register has set for itself, in addition to its primary object of the classification of ships. Ships so supervised receive a distinguishing mark in the book, and when going before the underwriters for insurance it is inevitable that a preferential rate for such ships will be eventually made. During the past year a very large amount of hull insurance has been placed in London, and so great has been the energy of Great Lakes Register in placing its book before the London underwriters that there are now only a few who are not subscribers to it. As its ratings are thus brought directly to their attention, the advantage of its "star and crescent" is evident. So, in the end, a ship-owner who pursues careful methods in the construction of his ships, will more than make up for his original outlay by the favorable rates of insurance which he will receive and which he will be enabled to demand on his ships.

Notwithstanding many warnings and prophecies to the contrary, the Great Lakes Register has been flooded with applications for its classification on ships. Over 400 have been classified this year and very appropriately designed certificates issued to the owners for them. Among the numerous owners who have sought this classification are found such prominent names as Western Transit Co., Northern Steamship Co., Mutual Trans. Co., North Western Transportation Co., Wilson Transit Co., American Transportation Co., Lake Erie Transportation Co., Ogdensburg Transit Co., Harvey H. Brown, W. C. Richardson, Lake Superior Iron Co., Republic Iron Co., Roby Transportation Co., R. R. Rhodes, James McBrier, John Corrigan, Edward Smith, W. A. Hawgood, W. E. Fitzgerald and W. A. Livingstone. A supplement of about forty pages containing a list of the ships recently classified is to be issued very shortly and sent to the regular subscribers of the work. A list of the latter is also to be published.

ENLARGEMENT OF THE CRAMP SHIP YARD.

Details have finally been mapped out for the enlargement of the works of the Wm. Cramp & Sons Ship & Engine Building Co., at Philadelphia. Not only will there be provided additional berth room that will enable the company to place under construction twice as many vessels as at present, but the dry dock facilities will be so improved as to permit of repairs being made on any vessel that can pass up the Delaware river. The acreage of the plant will be more than doubled by the purchase of adjoining land, and by the lease of the Sepviva estate the main works will be joined with the present dry dock and marine railway property, giving the Cramp company nearly half a mile of river front. Several purchases of land have already been made, and a large piece of property adjoining the present works and owned by the Lehigh Valley Railroad Co. has been secured on a lease covering a period of ninety-nine years. Plans for the new dry dock have not yet matured, but it is understood that the dock, which will be built of stone and cost $1,000,000, will be situated alongside the marine railway.

The price paid for the Wheeler ship yard of West Bay City by the American Ship Building Co. (consolidated ship yards of the great lakes) is not given out. Probably it is not looked upon as an item of public property. Neither does the amount which F. W. Wheeler is to have left after the matter is settled up seem to be regarded in that light. It is simply said that he will have a snug sum of money. Time alone will develop what will be done with the West Bay City plant by the consolidation. The story of this transaction, briefly told and without anything being said that is not quite generally known in ship building circles, is that F. W. Wheeler had the support of L. M. Bowers, who is John D. Rockefeller's representative in the Bessemer Steamship Co. on the great lakes. With a ship yard hopelessly involved in indebtedness, and with prices of ship building material advanced to figures that forced even the prosperous concerns to a halt, it is certainly remarkable that anyone should succeed in so unraveling the tangle that surrounded the West Bay City yard as to admit of its sale. The sale was, of course, brought about mainly by gathering up the bonds that represented a first lien on the property, but aside from this there was the other highly important factor of the influence of the Bessemer Steamship Co., with its claims resulting from the three last boats built at West Bay City. Then, too, the Wheeler plant was a realty needing little effort to again bring about a reorganization after the clearing up of bonds, especially in view of the present demand for ships. In other words, the West Bay City yard would undoubtedly have been given consideration in the consolidation from the beginning but for its financial condition, and the purchase of a few days ago by the American Ship Building Co. was not therefore at all like a new proposition and was not so considered.

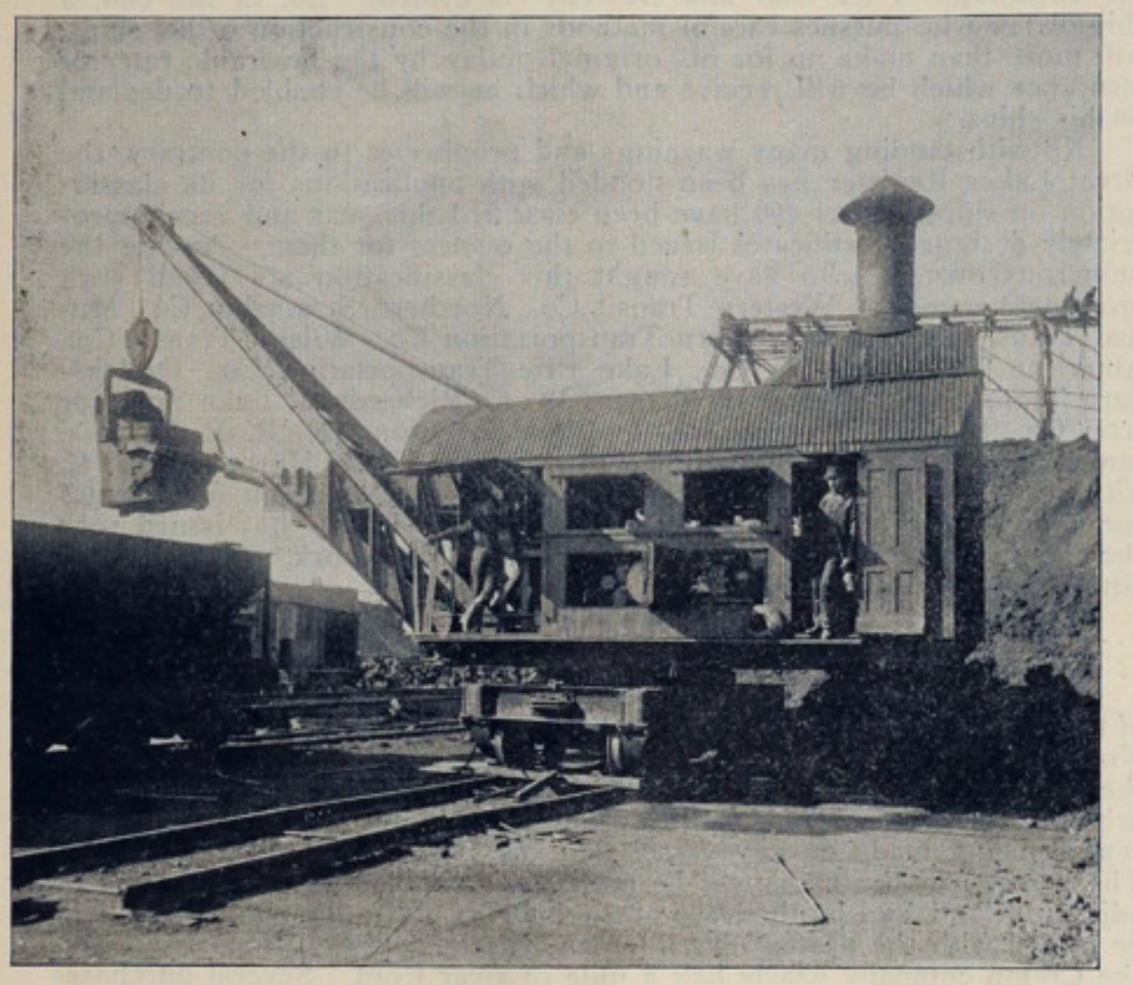
PRESIDENT McKINLEY.

HOW ORE IS HANDLED.

CONNEAUT, THE CARNEGIE PORT ON LAKE ERIE, WILL SOON BE THE GREATEST POINT OF TRANSSHIPMENT ON THE CHAIN OF LAKES—WONDERFUL DEVELOPMENT OF A FEW YEARS—A GREAT VARIETY OF MODERN MACHINERY.

Conneaut, Ohio, June 17, 1899. (Spl. Cor.) Less than seven years ago not a shovelful of iron ore had been unloaded from a lake vessel at this port. Today it stands without a rival as an evidence of the rapidity of modern industrial development, and thousands upon thousands of dollars are being spent upon further improvements that will place it pre-eminent as the greatest port on earth for the transfer of iron ore from ships to cars. The march of progress in everything pertaining to the manufacture of iron and steel in this country, from the time the crude material is taken from the ground until it is passed to the hands of the consumer of the finished product, has attracted the attention of the world. Especially has this progress been accelerated by the recent organization of large industrial combinations. Hundreds of miles of new railway in the mining region, open-pit mines from which the ore is removed by steam shovels, and shipping docks costing millions, as well as steel vessels of capacity unthought of a few years ago, must all be taken into account in measuring the enormous equipment that is required for the movement of fifteen million gross tons of iron ore in seven months of navigation on the great lakes; but there is another link—the ore docks of Lake Erie—in the chain of transportation facilities connected with this industry that is of equal importance.

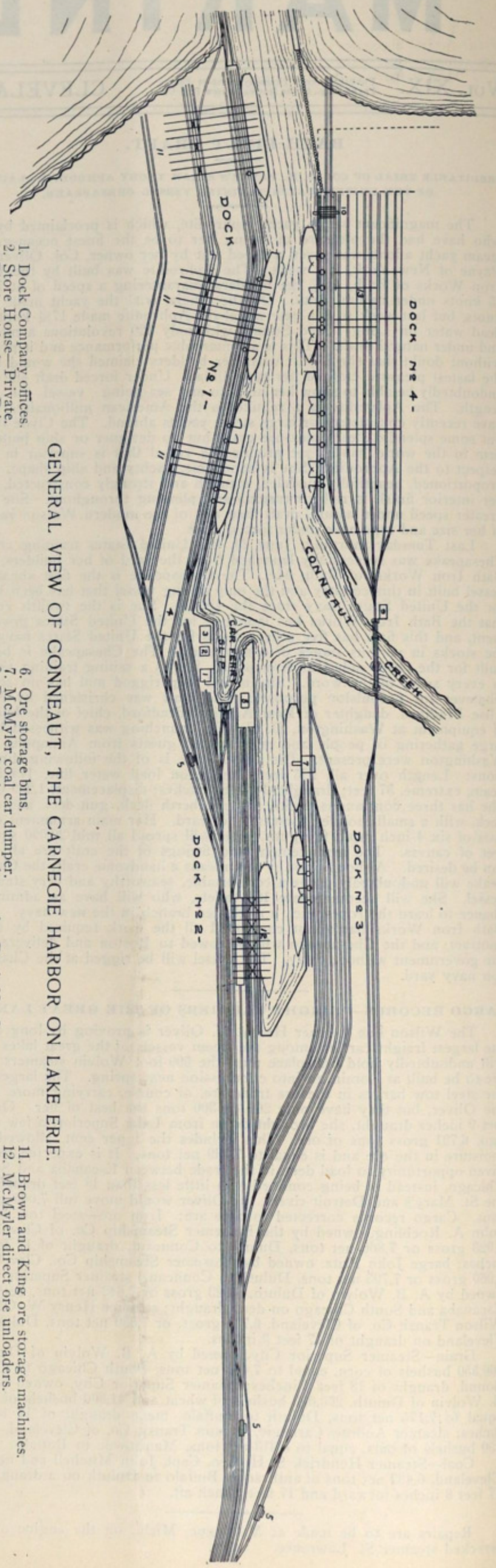
The development of docks at Conneaut, the Carnegie port on Lake Erie, which is connected with the iron and steel works of Pittsburg by the Pittsburg, Bessemer & Lake Erie Railroad, also controlled by Carnegie interests, will best serve to show what has been going on at ports of delivery, while preparations have been under way for a 15,000,000-ton output in the upper-lake region. In 1898, 1,404,169 gross tons of ore was



THEW SHOVEL ON THE CONNEAUT DOCKS.

unloaded at this port, as against less than half a million tons in the previous year when the plans of the Carnegie company for the mining and transportation of its own ore had only been partly developed. This year, if the program now outlined is carried out, there will be handled on the property of the Pittsburg & Conneaut Dock Co. (name of the corporation operating the docks) nearly 2,500,000 tons of ore. This great increase in tonnage is possible only with such an organization as the Carnegie company, which will probably use this year, including Cuban ores, about 4,000,000 tons of the raw material. A sketch in the opposite column of this page, together with numerous illustrations from photographs, will serve to show quite clearly the results of improvement work that has been steadily under way at Conneaut for the past two years. The river is now 210 feet wide at its narrowest point and in some places it is 550 feet wide, and including the men engaged on the improvements there are upwards of 1000 hands employed on the docks.

The first Carnegie dock, or No. 1 as it is known, was constructed in 1892; then followed the installation of a McMyler direct unloading plant on dock No. 2. These occupied a frontage of more than 2,000 feet on the west side of the river and slip, and last year operations were begun on the opposite side, a McMyler car dumper, rail unloading machines and other devices being placed on dock No. 3. All through the winter the conversion of the remainder of the company's property on the east side into dock No. 4 has been in progress, and now the Carnegie interests have here a frontage of more than 5,000 feet suitable for unloading ore, a river and slip of sufficient depth and width to accommodate the largest lake vessels, machinery capable of unloading 20,000 tons of ore a day from vessels, and railroad facilities that have actually enabled the dock company to move 25,000 tons of ore from the yards here to furnaces within twenty-four hours. The equipment of these docks is interesting for many reasons, not the least of which is the fact that practically all known types of ore unloading machinery are included in the installation. On dock No.



GENERAL VIEW OF CONNEAUT, THE CARNEGIE HARBOR ON LAKE ERIE.

1. Dock Company offices.
2. Store House—Private.
3. Blacksmith shop—Private.
4. Machine shop and power station.
5. Weighing scales.
6. Ore storage bins.
7. McMyler coal car dumper.
8. Rope car haulage power house for Dock No. 2.
9. Rope car haulage power house for Dock No. 4.
10. Hulett ore unloader.
11. Brown and King ore storage machines.
12. McMyler direct ore unloaders.
13. Ore storage "whirler" bridges.
"Whirlers" or revolving derricks.

1 are seventeen bridges built by the Brown Hoisting & Conveying Machine Co. of Cleveland. Five of them are without cantilevers. Of the seventeen, eight were erected some time ago, while nine second-hand machines were put in during the past winter. The length of the runway is 180 feet from center to center of tracks, the cantilever is 72 feet, the apron 35 feet and the total length of bridge 290 feet. The capacity is about 40 tons an hour loaded direct into cars. This is with allowance for slight delays in the switching of cars. Two railroad tracks extend the length of this dock under the bridges and an increase to three tracks will shortly be made. Engines of the Brown machines are 8½ inches cylinder diameter with 12 inches stroke. On this stretch of water front there are also six bridges built by the King Bridge Co. of Cleveland. An advantage claimed for these machines is that they are equipped with two engines

(From Conneaut Post-Herald.)

GENERAL VIEW OF CONNEAUT HARBOR WITH ORE VESSELS UNLOADING.

of from 17 to 20 cubic feet, which is equivalent to about 1½ tons, governed somewhat by the quality of the ore. Dock No. 1 is also equipped with six "whirlies" of the usual type and two Thew shovels, for loading ore from stock piles to cars. One of the Thew machines, which are built by the Variety Iron Works of Cleveland, weighs 51 tons, has a radius of 25 feet, and has a dipper scoop with capacity of 4 tons, while the other weighs 32 tons and is fitted with a scoop of 2 tons capacity. A car of ordinary size has been filled with ore by one of these shovels in six minutes.

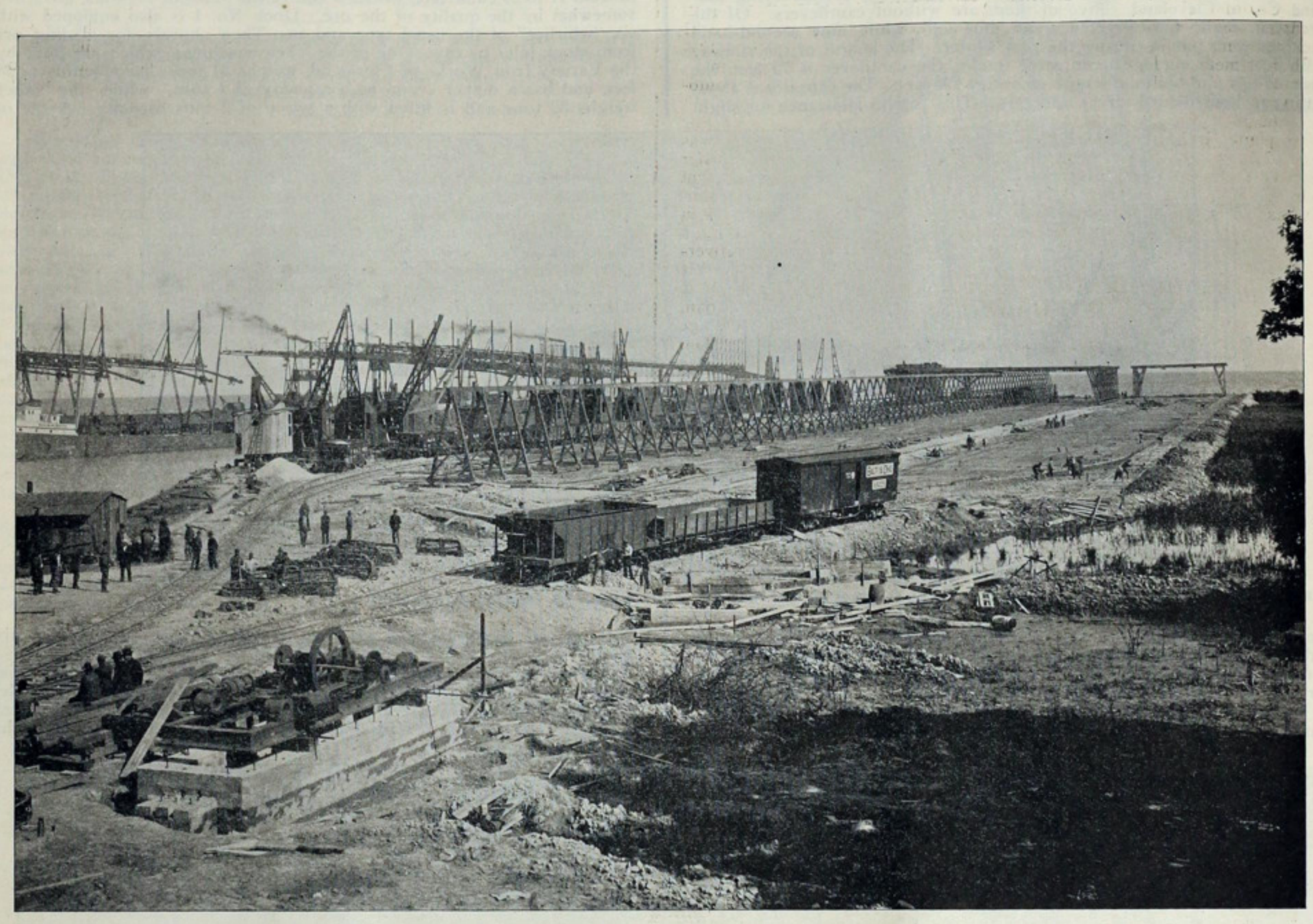
What has very appropriately been termed the "fast plant" occupies dock No. 2 on the west side of the slip. It was built by the McMyler Manufacturing Co. of Cleveland, and is interesting for the reason that probably the speediest records for ore unloading ever made stand to the

Modern Ore Dock Equipment at Conneaut, the Carnegie Harbor on Lake Erie.

General view of the harbor, showing latest improvements on east side of the river.

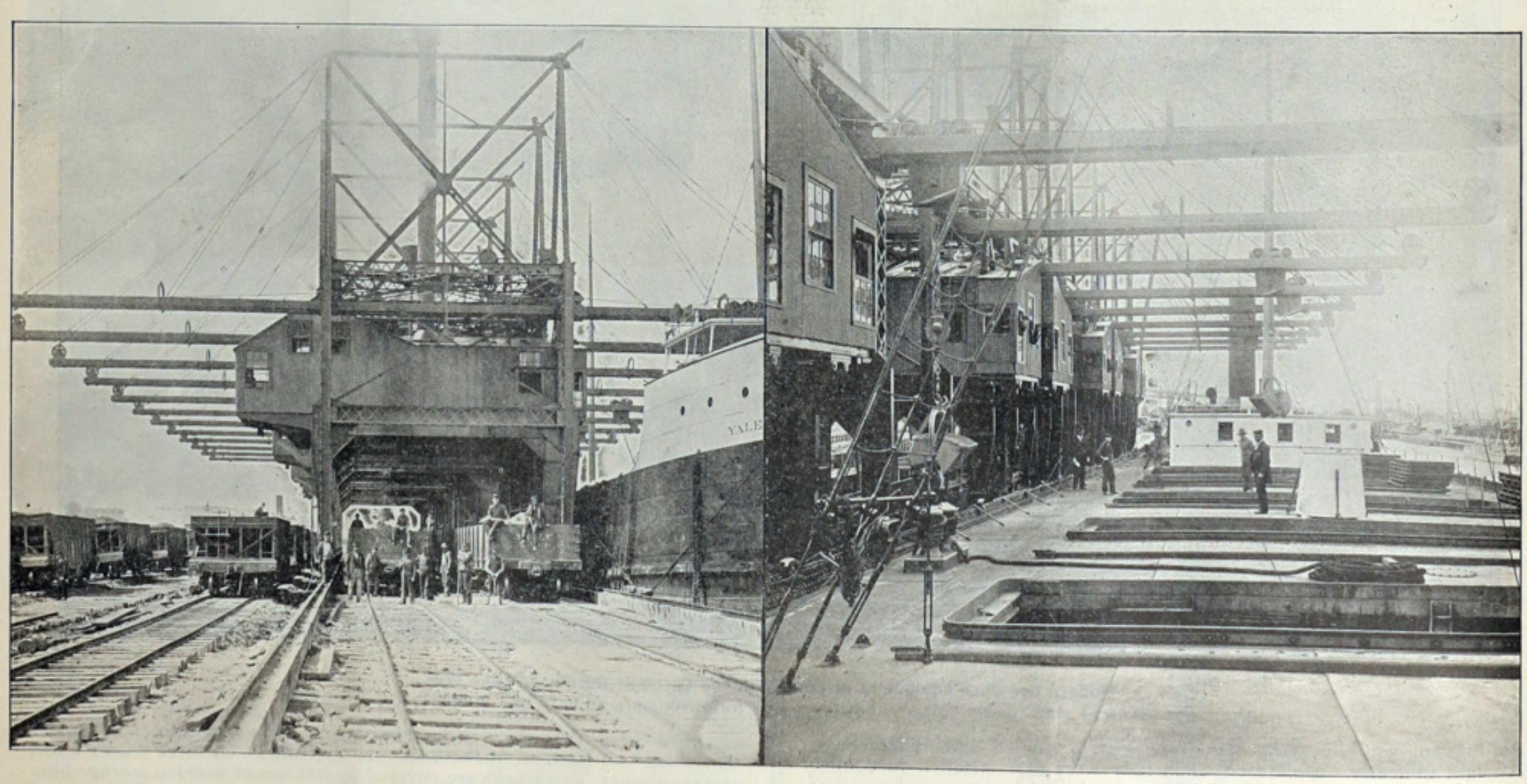
and hoisting and conveying operations may be carried on simultaneously. A slight difficulty experienced when they were first installed in connection with the movement of the machines on the tracks has now been overcome, and officials at the docks are quite enthusiastic regarding the working of the King machines. The hoisting speed of all machines is in the neighborhood of 450 feet a minute, and the buckets used have a capacity

credit of these machines. This plant consists of twelve direct unloaders. There are two railroad tracks under the machines and three tracks under the cantilevers. Two tracks are covered by 300 feet of wooden storage bins. These machines each have cantilevers 40 feet in length, while the "aprons," which extend over the vessel side of the dock, are also of a length of 40 feet, the complete machine being 107 feet in length. Buckets are of 1½ tons



Modern Ore Dock Equipment at Conneaut, the Carnegie Harbor on Lake Erie

View of new ore storage plant on east side of harbor entrance.



Modern Ore Equipment at Conneaut, the Carnegie Harbor Dock on Lake Erie.

End views showing ship's deck and car side of McMyler direct ore unloaders.

capacity. The machines are arranged in groups of three—that is three bridges move as one. The maximum spread from center to center of bridges is 36 feet, while on the other hand they may be drawn in to 21 feet. The machines are operated by two-cylinder reversing engines, 10½ inches diameter and 14 inches stroke, to which steam is supplied from an 80-horse-power boiler, 5 feet in diameter by 17 feet long and of locomotive type.

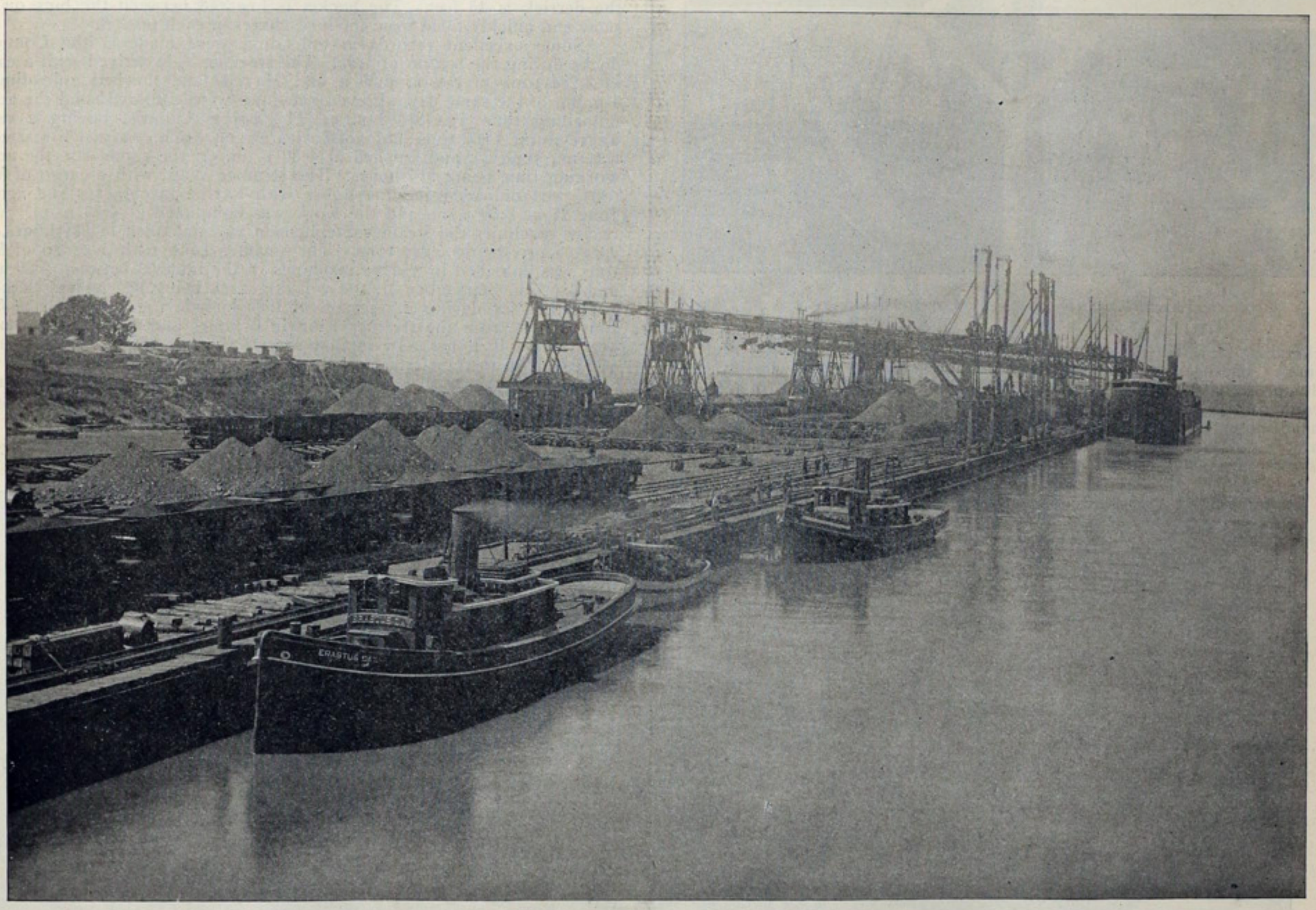
On dock No. 3 on the east side of the slip very nearly opposite the "fast plant" is located the McMyler car dumping machine, which was erected during the season of 1898. This machine is guaranteed to transfer fifteen cars of coal per hour to vessels, but experience has shown that nearly double that number of cars can be handled under favorable conditions. It is one of the simplest of all types of car dumping machines in its operation. Cars to be unloaded are first run down an incline, and upon being cut loose run into a kick-up track. As the car passes under an overhead tank the coal is wetted, and then by a haulage system the car is brought under the cradle of the machine. As this cradle tips, the car is clamped to the track. The tipping of the car sends the coal into a pan, which also tips correspondingly, thus preventing any excessive breakage of the coal. As the pan fills, it is lowered back into a horizontal position, and thus the coal is transferred gradually to the vessel. The cradle has also been meanwhile lowered back into position and a loaded car pushes the empty one out. The door in the pan through which the coal passes to the chute which conveys it to the boat opens automatically when the pan strikes the chute. The end of the scoop is telescopic and may thus be adjusted to any vessel. The car dumper proper is operated by an engine of 16 by 18 inches. This tips the car and hoists the pan. Another engine of 12 by 16 inches hauls the car into the cradle and the telescopic apparatus is operated by an engine of 6 by 8 inches. Steam is supplied from a 150-horse-power Cahall water tube boiler.

On dock No. 3 there are also three rail unloading machines of a type designed by Capt. E. Day, but the patent rights for which are now held by the Carnegie company. By this invention fourteen steel rails can be handled with the speed formerly required for one and with less labor; indeed the only hand labor involved is that necessary to pile the rails together. The rails are held in a box or carrier supported by chain attachments. After being lifted the rails are tilted into any desired position so as to enter the hatch of the ship. The carrier, which naturally strikes first after the load enters the hold of the ship, is enabled by rollers or casters with which it is provided to travel easily over the floor or a bed of rails as the case may be, and thus the rails are easily placed in position. Last season seven 30-foot rails were handled at a time and the cost of handling was not more than about 15 cents a ton, as against 40 cents by the old method, which involved a great deal of manual labor. About 800 tons of rails a day were handled at this dock. These rail handling machines were not put into operation until last season was well advanced but an aggregate of 75,000 tons of rails was handled during the remainder of the season. Some very creditable records were made. The steamer Hesper, for instance, which had been engaged in carrying rails for years and never before loaded at the rate of more than 300 tons a day, took aboard 950 tons in eight hours in July last by the use of this machine. The steamer Gladstone loaded 2,575 tons in thirty-three working hours, and other instances are plentiful where the best records of the English shipping ports have been surpassed at Conneaut.

On this dock for the loading of steel rails there is now a derrick of the "whirley" kind that has almost double the power of the kind of machine formerly in use. This increased power permits of fourteen rails instead of seven being handled in a bunch and increases the capacity of the dock to about 1,500 tons of rails daily, reducing at the same time the cost of handling to 10 or 12 cents a ton.

Interest in the Conneaut improvements at present very naturally centers in dock No. 4, the new property on the east side of the river, which bids fair to within a few years become of first importance in the handling of ore. At the close of navigation last year the whole territory now occupied by dock No. 4 was little more than a swamp. The dock is now 1,200 feet in length and over 500 feet in width. The construction work was done by the Standard Contracting Co. of Cleveland. The river was dredged to a depth of 20 feet, taking out between 2,000,000 and 3,000,000 cubic yards of earth, which was used for making land for the dock. The dredging also widened the channel to a considerable extent, its present width in the narrowest point being 210 feet, while at some points it attains a width of 550 feet.

This new dock has been temporarily equipped with sixteen "whirlies" of the type generally used around the lakes, and nine wooden trestles, pending experiments to be made during the present season with the Hulett automatic ore unloading machine, which is being built by the Webster, Camp & Lane Machine Co. of Akron. Should the Hulett machine prove all that it is hoped for, the dock may be equipped quite extensively with this new apparatus, and if not cantilever bridges of the latest type will probably be installed. The Hulett machine, with which experiments are to be made, is designed to do away with the shoveling of ore in the holds of ships by large gangs of men. The shovel of this machine is of the clam-shell type, has a capacity of ten tons and is operated by a hydraulic cylinder. The shovel is attached to a mast, which revolves in a complete circle, and in which an operator is stationed. By means of the walking beam to which it is attached, the mast is run out over the boat, lowered through a hatch and turned in any direction, its radius being about 9 feet, which will, of course, enable the scoop to reach the bilge of the vessel. After the shovel has been closed, it is lifted from the hatch and run back over the cars into which it is desired to load the ore.

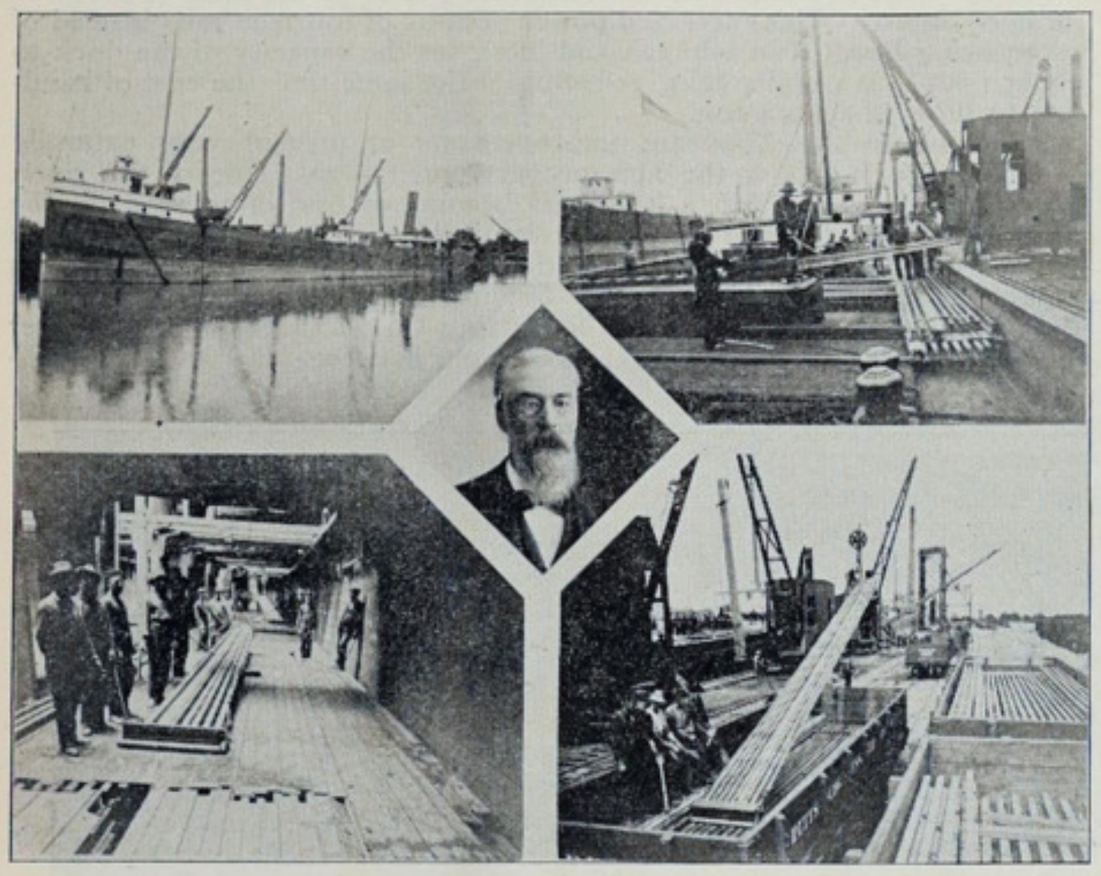


Modern Ore Dock Equipment at Conneaut, the Carnegie Harbor on Lake Erie.

Hoisting and conveying machinery of Brown and King type for both storage and direct loading into cars.

It is claimed by the inventor that the machine will handle 300 tons of ore an hour from boats to cars, and it is further claimed that the machine will take out from 90 to 95 per cent. of the ore in a hold. Two men, it is thought, will be required to operate the machine and three men to clean up the remnant of ore that cannot be caught with the shovel.

The temporary arrangement on this new dock for the transference of ore from vessels to stock piles consists of wooden bridges, which rest at either end upon towers placed on regular standard-guage railroad tracks and supported in the middle by a trestle, an excellent idea of the



CAPT. DAY AND HIS RAIL UNLOADING DEVICE.

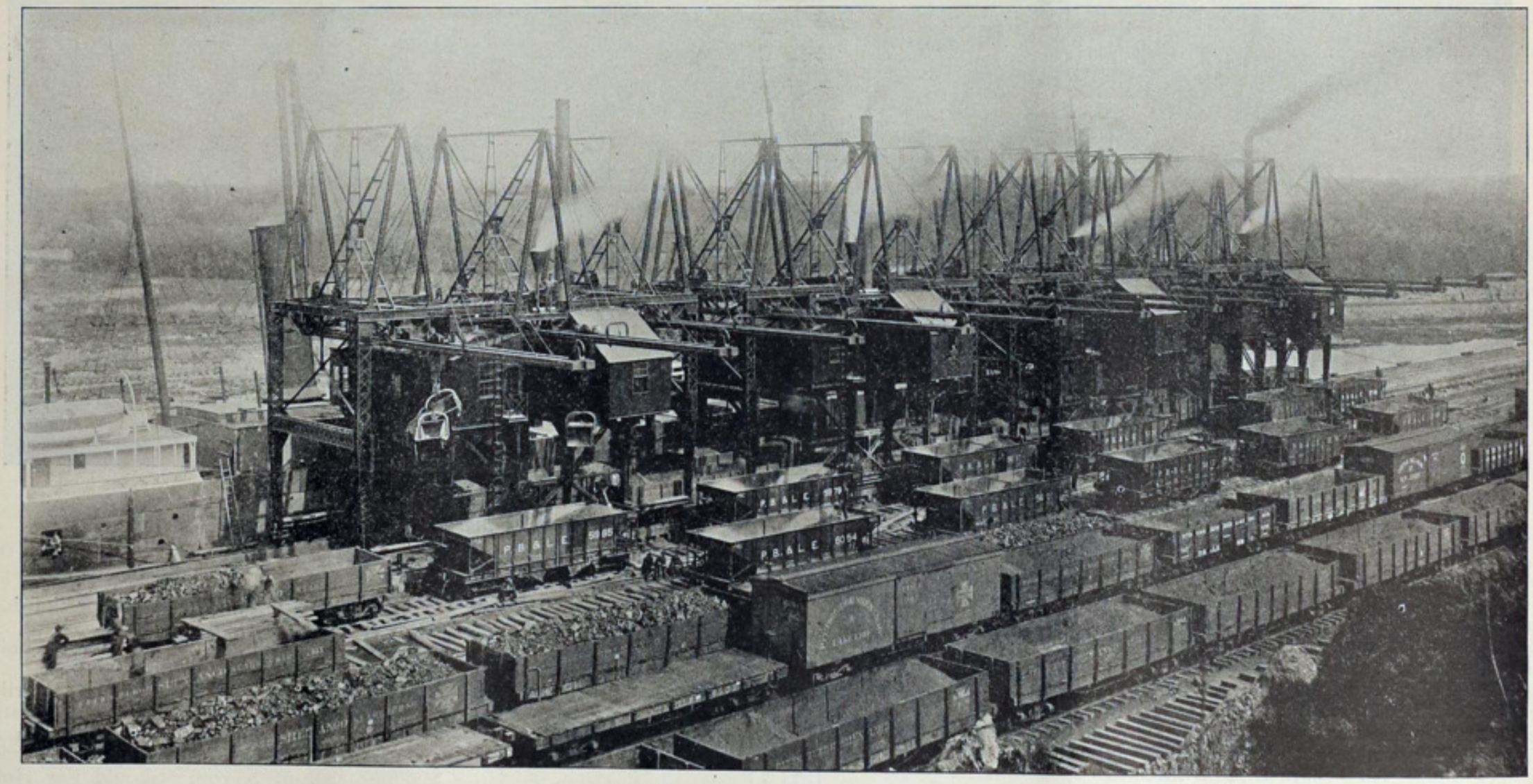
character of which may be obtained from one of accompanying illustrations. The ore is taken from the holds of vessels by the "whirlies" and dumped into three-ton side-dumper iron cars, each of which is of capacity equal to two loads of the "whirley" buckets. These cars are propelled by hand along the bridges and dumped onto stock piles below. There are nine wooden bridges, each 150 feet in length, and in the rear of these are located three bridges each 75 feet in length. The arrangement of the bridges is such that the three last mentioned may be placed in the rear of any of the first mentioned bridges, thus making a continuous run of 225 feet in case it is desired to stock ore on piles at considerable distance back from the water front.

Improvements now in progress at these docks also include a number of departures from previous methods of handling ore. One of these is the car haulage system, which will embrace in its operation all four of the Conneaut docks. This equipment consists of a stationary engine (one on each dock) operating a drum for large steel cables which run between the tracks. The cables are fitted with clamps, which can be quickly fastened onto the cars to be moved, and as the cable is endless and kept constantly in motion, cars can be handled in the most expeditious manner possible. As an illustration of the equipment on all docks it may be noted that the power plant on dock No. 2 consists of an engine of 12 inches diameter of cylinder and 16 inches stroke of piston. The endless steel cable is 1⅛ inches in diameter and 1200 feet in length. The engine and machinery was furnished by the Litchfield Car & Machine Co., Litchfield, Ill.

When it was said in the beginning of this article that the dock management at Conneaut hoped to handle 2,500,000 tons during the present season, the statement was made with the understanding that night work is to be undertaken. It is proposed to begin later in the season the regular operation of the Conneaut docks by night as well as day. A building now in course of erection will combine with its usefulness as a power house and lighting plant, utility as a blacksmith and machine shop and general store house. It is a frame structure 166 feet in length by 36 feet in width, a portion of it being two stories in height. The electric lighting plant will supply one hundred arc lamps and 250 incandescent lamps. As at the other principal Lake Erie ports, a fueling scow designed to facilitate the fueling of vessels while they are discharging ore, has been introduced at Conneaut during the present season. The scow, which is loaded from the car dumper, has four pockets, each capable of holding 125 tons of coal, while in the center is located a 5-ton "whirley" built by the Webster, Camp & Lane Machine Co. of Akron. The maximum span of the derrick is 45 feet. The bucket is lowered between the bins on the scow and quickly filled from inclined chutes in each pocket.

Some excellent records in unloading were made at the Conneaut docks during the season of 1898. The steamer Yale arrived with a cargo of 4,284 tons of ore at 6:30 a. m., May 30 and finished unloading at 4 p. m., of the same day. Eleven machines were employed and the actual unloading time was 8½ hours. The barge Aurania, having a cargo aggregating 4,867 tons, unloaded with eleven machines, which started at 6 a. m., June 25, and finished at 4:30 p. m. on the same day, the actual working time being 9½ hours. The steamer Watt, with a cargo of 5,025 tons, was unloaded in nine hours with twelve machines. She arrived June 27 at 6:30 a. m. and the work was completed at 4:30 p. m. With twelve machines the steamer Stephenson was unloaded in 9¼ hours, her cargo aggregating 5,226 tons. The steamer Linn with a cargo of 5,354 tons was unloaded by twelve machines in the interval between 6:30 a. m. and 5 p. m., September 21, the working time being 9½ hours. Records made thus far during the season of 1899 include the unloading of 5,500 tons of ore from the steamer Linn in 9 hours and 4,900 tons from the Hartnell in 10 hours. In regular service the fast McMyler plant is depended upon to transfer from ship to cars 6,000 tons in 12 hours.

The Pittsburg, Bessemer & Lake Erie Railroad, over which ore is transported from Conneaut to the Carnegie plants in the vicinity of Pittsburg, operates a total of 227 miles of track. The entire line is laid with 100-pound steel rails, maximum grades are 30 feet to the mile, and 80 per cent. of the line is straight track. Fifty-one locomotives and 2,708 cars are in use. Thirteen hundred of the cars of this line are of the 50-ton steel hopper type. There will be added to the equipment this year 600 steel gondolas—an excellent type of car for general use, the capacity being in the neighborhood of 40 tons. A unique method followed on this railroad is to make up trains with two locomotives at the head and one half way back in the train. By this method forty-five loaded steel hoppers can be moved, which is said to be considerably more than could be handled were the cars made up into three separate trains. The siding facilities at Conneaut are excellent, and from 350 to 500 cars have been handled daily.



Modern Ore Dock Equipment at Conneaut, the Carnegie Harbor on Lake Erie.

View from land side of McMyler direct ore unloaders for transfer from ships to steel cars of 50 tons capacity—a plant that unloads 6,000 gross tons of ore per day.

MASTER OF SCIENCE.

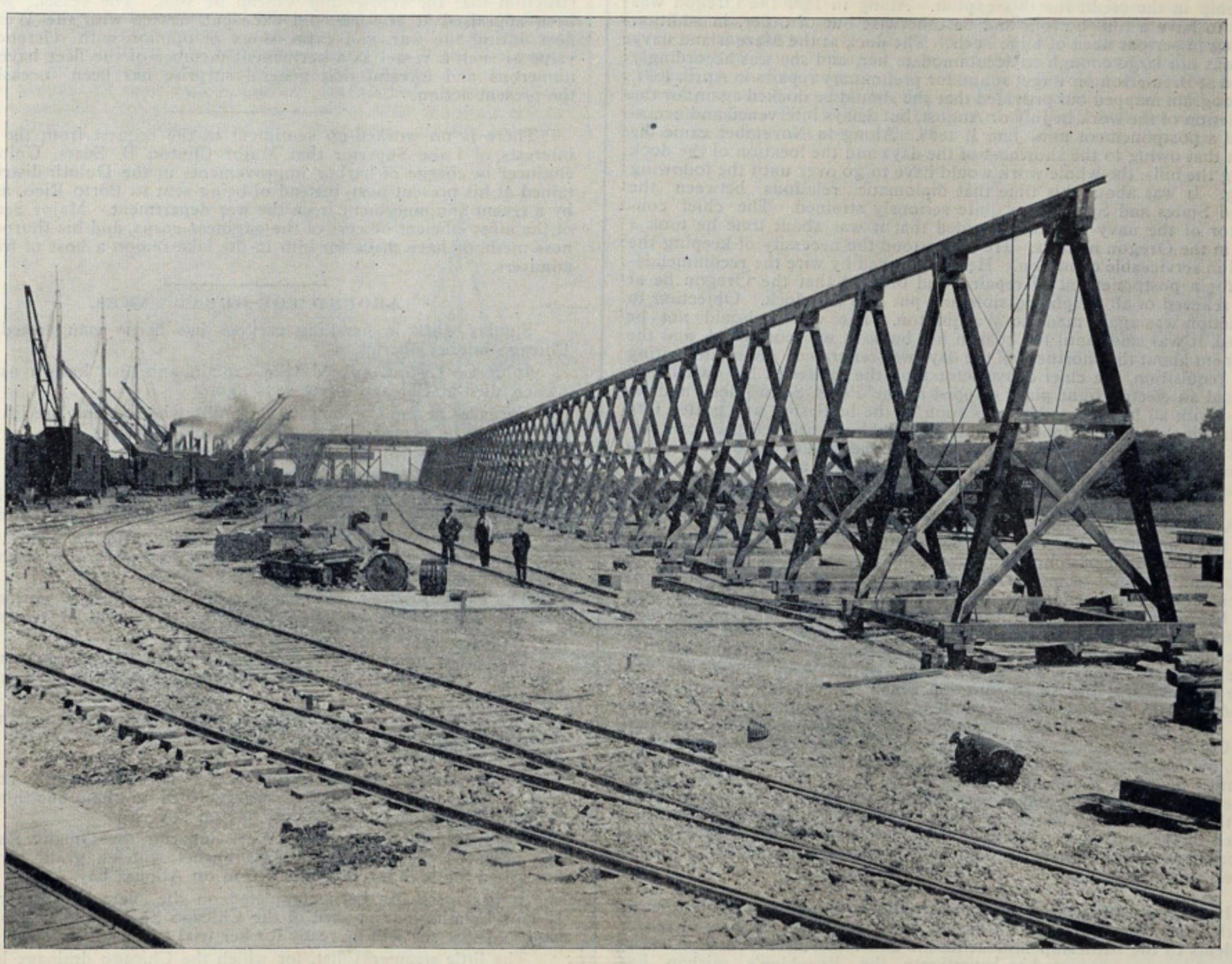
HONORARY DEGREE CONFERRED UPON REAR-ADMIRAL GEORGE W. MELVILLE, ENGINEER-IN-CHIEF OF THE UNITED STATES NAVY, BY COLUMBIA UNIVERSITY.

Rear-Admiral George W. Melville, engineer-in-chief of the United States navy, received on June 7, 1899, the honorary degree of Master of Science from Columbia University, New York. In introducing the admiral to the president of the university during the commencement exercises, Professor F. R. Hutton, head of the department of mechanical engineering, spoke as follows:

"Mr President—I am to present to you Rear-Admiral George W. Melville, engineer-in-chief of the United States navy, who has been named by the trustees for the honorary degree of Master of Science. It is significant that this degree is given today for the first time in the history of the university and that its award should be to one to whom the honor is so singularly fitting. I present to you Admiral Melville as a Master of Science, both in that field where knowledge for its own sake is its own exceeding great reward, and also in that where the mechanical engineer leaves the impress of his thought and creative energy upon concrete achievements in iron and steel.

"I bring you, sir, one who has made himself, in the first place, an authority and expert upon arctic exploration. This knowledge has been acquired in service as an officer, first upon the Tigress in the search for a part of the crew of the Polaris, later as engineer officer of the Jeannette under Lieut. De Long, and finally with the relief party which went to rescue Greely with the Thetis and the Bear. It would be impossible to refrain from a reference to the revelations of personal quality which belong to the experience of these years and yet only a permitted hand should lift the veil from the tragedies which it conceals. I speak only with bated breath of the imprisoned Jeannette with her frames cracking under the remorseless grip of the ice pack; of the terrible journey across the floes to the launching in the icy sea; of the long exposure to the arctic gale in open boat, which left its impress on arms and feet, frozen to disablement from exposure; of the lonely landing upon an island of the Lena Delta in Siberia; of the unfaltering prosecution of a search for comrades, when even hardy natives were cowed by the warring elements; of the heart-breaking end of the search when only the dead were found in their last bivouac; of the lonely burial on the shores of the unfriendly sea. These, sir, are memories to thrill under and not to recount lightly.

"But I turn rather to the achievements of Admiral Melville in that other field where as mechanical engineer he has impressed himself upon the engineering of the navy of our country. Melville is now serving as engineer-in-chief of the Unitd States navy for his third term. When he was appointed in 1888 the only modern vessels in commission were the Atlanta, the Boston and the Dolphin, two cruisers and a dispatch-boat. The twelve years of his service have enabled him as bureau chief to be responsible for the design and engining of 120 ships, aggregating 700,000 horse power. Beginning with the San Francisco, the earliest American-designed vessel of our modern navy, his sound mechanical judgment, his boldness, and his progressiveness have culminated in the Columbia and the Minneapolis, each triple-screw giants, each holding for a time the world's record for speed. But, sir, lest I weary with technical detail I pass to a final reference, to that upon which Columbia today bases her meed of praise. I refer, sir, to the significance in the war of 1898 which belongs to the preparation and the achievements of the navy in the Spanish-American conflict. The conception of a floating-machine-shop, whereby vessels could be outfitted and repaired a thousand miles from a shore basis and a navy yard, and the development of economical distilling ships whereby a large body of men and vessels on blockade could be supplied with fresh water without the necessity of touching a hostile shore, and the condition of the engineering departments of our vessels when the hour of battle had struck, give Admiral Melville's leadership a significance which we are glad to honor. It must not be forgotten, sir, that the achievements of the captains of our fleet are the result, in great part, of the thought, the planning, and the capacity of those engineers who gave them their weapons and who operated for them the battle machines with which their work was done. Sir, I present you Rear-Admiral George W. Melville."



TRESILE SUPPORTING TEMPORARY WOODEN BRIDGES ON CARNEGIE DOCK NO. 4 AT CONNEAUT, O.

C. S. Swan & Hunter of Wallsend-on-Tyne, England, are building a vessel considerably over 600 feet in length, which is understood to be for the Cunard company. Progress on the vessel, which would under ordinary conditions have been seriously retarded on account of a great deal of wet weather in England of late, has been entirely satisfactory owing to the covered berths provided.

Plans and specifications have just been prepared by the life saving service for the stations at Gloucester and Nahant, Mass., authorized by the last congress, and bids for their construction will be called for at once.

A $100,000 electric power plant is to be installed at the Brooklyn navy yard.

Nickel Plate road excursion to California account of National Educational Association convention at Los Angeles, Cal.—Tickets on sale June 24 to July 7. One fare, plus two dollars, for the round trip. Ask agents of the Nickel Plate road for particulars. 44, July 6.

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

Published every Thursday at No. 418-19 Perry-Payne building, Cleveland, Ohio, by THE MARINE REVIEW PUBLISHING CO.

Eastern Agents—The Samson Advertising Agency, 102 and 104 Fulton St., New York, N. Y.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, $1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

Few achievements in the navy have been attended by greater diversity of credits than the performance of the battleship Oregon in steaming around the continent during the Spanish-American war and arriving at Key West with machinery in good condition. Now it appears that Rear Admiral Hichborn of the bureau of construction and repair is justly entitled to share with the builders, commander and chief engineer of the battleship in the credit for this exploit. Along in 1897 the Oregon was found to have a foul bottom and be otherwise out of order, in addition to being in serious need of bilge keels. The dock at the Mare island navy yard was not large enough to accommodate her, and she was accordingly docked at Bremerton on Puget sound for preliminary repairs in April, 1897. The program mapped out provided that she should be docked again for the completion of the work in July or August, but delays intervened and necessitated a postponement until Jan. 1, 1898. Along in November came the report that owing to the shortness of the days and the location of the dock among the hills, the whole work would have to go over until the following spring. It was about this time that diplomatic relations between the United States and Spain were quite seriously strained. The chief constructor of the navy therefore decided that it was about time he took a hand in the Oregon matters. He understood the necessity of keeping the vessel in serviceable condition. He disapproved by wire the recommendation for a postponement of repairs, and ordered that the Oregon be at once relieved of all weight possible and put into dry dock. Objection to this action was again made to Washington. The vessel should not be docked, it was said, until the coal in her bunkers was consumed, and the argument about the shortness of the days was reiterated. Without waiting for a requisition, the chief constructor took the matter in his own hands and had an electric light plant shipped to the Puget Sound dock and installed with all haste possible. As soon as the battleship was gotten into the dry dock, early in January, Admiral Hichborn ordered the construction over her of a shed such as would enable the men to continue work in inclement weather. The work was carried on night and day and by Feb. 16 the Oregon was ready to leave the dock.

Although it was said not long ago that the Cramp ship yard, for a long time famous as the greatest works of its kind in America, was losing ground on account of competition from the newer yards with modern equipment, it would seem that this opinion is not at all borne out by the present condition of affairs at the Philadelphia works. It will be some time before enlargements and improvements now under way become fully effective, but this does not seem to interfere with new orders or with the prosecution of an immense amount of work that has been under way for some time past. Only a few weeks ago a contract was closed for two more steamers for the Ward line, for which the Cramps recently completed the Havana and Mexico, both of which exceeded contract speed. Last week the company closed contracts with the International Navigation Co. for two steamers of greater dimensions than the St. Louis and St. Paul, and despite the crowded condition of the yards and difficulty in securing material, promised delivery inside of a year. Work is being rushed on the battleship and cruiser building for the Russian government. and they will be ready for delivery long before the expiration of the time named in the contracts. Work on the battleships building for our own government is also somewhat in advance of the progress made on similar vessels in other yards.

It would seem that there is some ground for complaints made regarding the condition of New York harbor and approaches, in view of recent accidents to the battleship Massachusetts and the cruiser Brooklyn. The court of inquiry appointed to investigate the Brooklyn's mishap has recommended that no further proceedings in the matter be taken. All the officers of the cruiser are exonerated, and the light-house board has been requested to place a buoy over the wreck on which the vessel grounded, and to notify the army engineers of its existence, in order that it may be removed. Another vessel of the navy whose escape from serious damage seems to have been due to providential circumstance is the cruiser Columbia, upon which a fire occurred while she was lying at League island navy yard a few days ago. Sparks from an engine ignited some waste saturated with oil that had been left on deck, and in a moment the deck was ablaze in several places. It so happened that the fire brigade of the navy yard was at drill and the flames were readily extinguished, although the deck was badly charred for a distance of 115 feet.

Rear Admirals Melville, Bradford and Hichborn, chiefs of the bureaus of steam engineering, equipment, and construction and repair, navy department, have not in any case expressed an opinion as yet regarding the plan suggested by Secretary Long for consolidation of the three bureaus. It is understood, however, that whatever may be the nature of replies to letters addressed to these officers requesting their views on the subject, Secretary Long will anyhow make a recommendation to congress in accordance with his original plan. It is the general opinion in naval circles that the project is impracticable and that there is small probability of congress being induced to take action in the matter.

Enthusiasm on the subject of submarine navigation is particularly noticeable just now in French journals. A late writer on the subject advances the suggestion that one hundred submarine boats be constructed immediately, including twenty-five of the Morse class and twenty-five of the Narval class, the remaining fifty to be provided for when other types of submarine craft have been thoroughly tested. Many of the projects advanced by the friends of the submarine boat do not seem to be practicable, while others are so preposterous, at least from an American point of view, as to justify a doubt as to the sanity of their champions. Meanwhile it is interesting to note that the allegiance of the American naval officers who have confidence in the submarine boat seems to have been in no sense shaken by adverse criticism recently provoked in Great Britain.

The declaration of Engineer-in-Chief Melville of the navy in his last report in favor of water tube boilers is now followed by the announcement that it has been definitely decided that henceforth all vessels constructed for the navy shall be equipped with boilers of the water tube type. In a recommendation recently made by the engineer-in-chief is the suggestion that the battleships Maine, Missouri and Ohio, upon which work has only just commenced, be constructed under plans calling for this type of boiler, and that the armored and unprotected cruisers authorized last fall be also fitted with the tubular type of steam generator.

One of the proceedings alike inexplainable to the layman and to the average naval officer is the recommendation of the naval board of construction that the repair ship Vulcan be sold. The vessel, which has been appraised at $100,000, did excellent service with the West Indian fleet during the war, and expressions of opinion with reference to the value of such a vessel as a permanent member of the fleet have been so numerous and forceful that general surprise has been occasioned by the present action.

There is no worked-up sentiment in the request from the shipping interests of Lake Superior that Major Clinton B. Sears, United States engineer in charge of harbor improvements in the Duluth district be retained at his present post, instead of being sent to Porto Rico, as ordered by a recent announcement from the war department. Major Sears is one of the most efficient officers of the engineer corps, and his thorough business methods have made for him in the lake region a host of friends and admirers.

AROUND THE GREAT LAKES.

Sunday work in handling cargoes has been inaugurated at the Chicago lumber district.

John G. Liston, an old lake captain and also known as a vessel owner, died at Chicago a few days ago.

Furnaces at the Calumet rolling mills where a new ore lift has been erected will be placed in operation within a few days.

On a recent trip the car ferry Ann Arbor No. 3 made the run from Frankfort to Menominee, a distance of 84 miles, in six hours.

Dredges are at work on the 20-foot channel in the Menominee river. It will extend from the mouth of the river to the Wells street dock.

It is understood that $8,000 is the price paid by Miles Barry, L. Windmuler and others of Chicago for the Lehigh Valley steamer R. A. Parker.

The captain of the wrecking tug Merrick, which is working on the wrecked steamer Harlem, claims that the vessel will be released within two weeks.

Chicago's board of assessors has decided that marine property in Chicago cannot be taxed on the tonnage system along lines followed in Minnesota.

Breaking of the swinging lever of the walking beam damaged the Goodrich liner Chicago to the amount of $3,000 while on her way from Manistique to Chicago.

South Chicago shippers estimate that the business done at that port so far this season would not aggregate more than one-third of that handled during the corresponding period last year.

According to reports from West Superior the Omaha Railway Co. has prepared plans for a 1,000,000-bushel wooden grain elevator and has asked for bids for its construction on Allouez bay.

Joiner work has been completed on the new passenger steamer Illinois building at the yard of the Chicago Ship Building Co. and it is expected that she will be ready for her trial trip in a few days.

The little steamer Juliet, for which the Chicago drainage board paid $18,000, has gone into commission at Chicago. She is 70 feet in length, 17 feet beam and 7 feet deep. The boat has been rebuilt and six berths have been arranged in the cabin.

The Sheriffs Manufacturing Co. of Milwaukee has supplied a new solid shaft coupling to the disabled steamer Elizabeth H. Strong. The Strong was rebuilt from the burned steamer N. K. Fairbank at a cost of a trifle over $20,000.

A continual rush to get out work characterizes present operations at the plant of the Racine Boat Manufacturing Co. at Racine, Wis. A large sailing yacht is being built for George Warrington and other Racine parties. A 32-foot sloop rigged yacht for A. J. Aikens and others was among recent launchings.

Among the best records for cargo handling made this season at the port of Chicago is that of the steamer Shenandoah, which entered the harbor at South Chicago at 3 o'clock last Saturday afternoon with 3,300 tons of ore and left at 4 o'clock Sunday afternoon with a cargo of 161,000 bushels of oats.

Bids for the improvement of Chicago harbor were opened by Assistant Engineer G. A. M. Liljencrantz, a few days ago, in the absence of Major W. L. Marshall. The lowest bid submitted was that of the Chicago Star Construction & Dredging Co. of South Chicago, whose bid is $73,788.70. Other bids were as follows: Lydon & Drews Co., Chicago, $94,499.70; Green's Dredging Co., Chicago, $97,358.00; Hausler & Lutz Towing & Dock Co., South Chicago, $99,600; Carkin, Stickney & Cram, Detroit, $132,081.70; Fitzsimons & Cornell Co., Chicago, $120,634. There is available for the work the sum of $100,000.

OUR LATEST CRUISERS.

DETAILS OF THE DENVER AND CLASS OF SHEATHED AND COPPERED VESSELS FOR WHICH THE UNITED STATES NAVY DEPARTMENT WILL SHORTLY PLACE CONTRACTS.

The six new cruisers of the Denver class are in one respect—that of being sheathed and coppered—a radical departure from previous practice; and they are in all other respects up to date. For many years Chief Constructor Hichborn stood almost alone in his advocacy of sheathing for ships' bottoms, but persistent argument, combined with many object lessons from the reports of our ships in service, which tended to prove the statements in favor of sheathing, have at last overcome the strong prejudice against it, and all of the twelve ships authorized by the last congress —three first-class battleships, three first-class armored cruisers, and six protected cruisers—are to be sheathed and coppered.

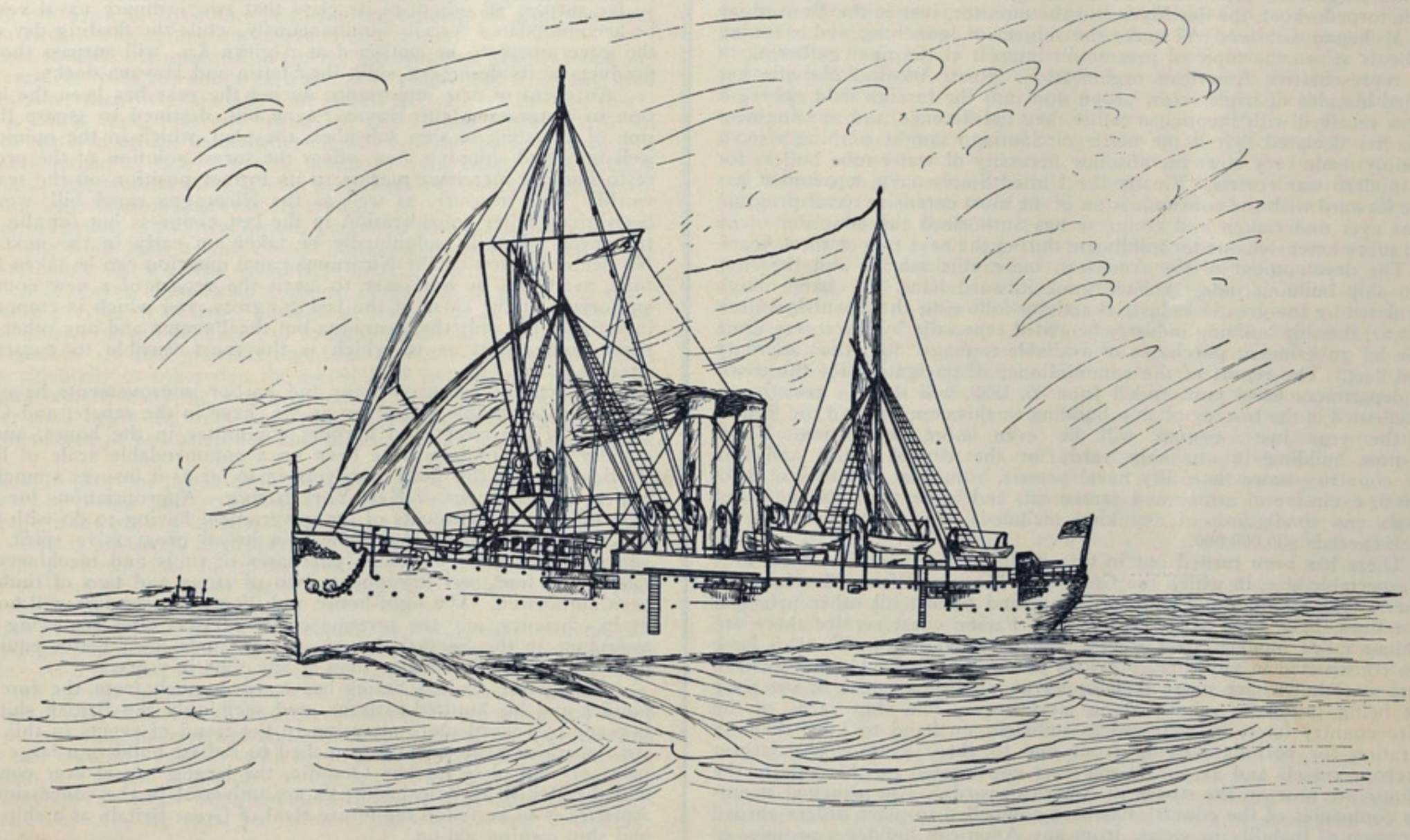
On account of the congressional limitation of the price which the department may pay for armor, and the improbability of being able to get any armor at that price, the six ships of the Denver class are the only ones for which contracts can be made without further action by congress. Designs for these ships are now being rapidly perfected by the bureau of construction and repair. They will be vessels of about the size of the Raleigh and Cincinnati, but improved and modernized. The latter ships were designed at the time when the craze for speed at all costs reached its maximum, and to attain this extreme speed, which it will be noted could only be maintained for a few weeks after they were docked and cleaned, on account of their rapidly-fouling unsheathed bottoms, too many other qualities were sacrificed, and they are now being altered to remedy this defect. The Denver and her sister ships are designed for a speed of 16½ knots, and will only make 17 knots when pushed, while the Raleigh and Cincinnati were designed for a speed of 19 knots. The former will be able to maintain their designed speed practically indefinitely, while the latter could scarcely maintain a speed of 15 knots, and that with an excessive consumption of coal. The horse power required in the new designs is 4,500, as compared with 10,000 in the Raleigh and Cincinnati, which means less than half the weight of propelling machinery. General dimensions and other features of the Denver and class will be as follows:

Length on load water line	292 feet.
Length, extreme	308 feet, 2 inches.
Breadth, extreme, about	43 feet.
Mean draught at trial displacement, two-third coal, ammunition and stores	15 feet 6 inches.
Extreme draught, fully loaded	16 feet 8 inches.
Trial displacement, about	3,100 tons.
Full load displacement, about	3,400 tons.
Coal carried on trial	470 tons.
Total bunker capacity, not less than	700 tons.
Speed on trial not less than	16½ knots
Type of engines: Vertical inverted, four-cylinder, triple expansion.	
Estimated indicated horse power	4,500
Type of boilers: Water-tube.	
Number of boilers	6
Sail area, about	6,000 square feet.

The main battery will consist of ten 5-inch, 50-caliber breech-loading rapid-fire guns, and the auxiliary battery will comprise eight 6-pounder and two 1-pounder rapid-firers, with four Colt machine guns. The guns will all be designed for smokeless powder, and the 5-inch guns will be more effective than the old type of 6-inch guns. Eight of them will be mounted on the main deck in recessed ports, the four forward ones having a range from right forward to 60 degrees abaft the beam and the four after ones from right aft to 60 degrees before the beam. The two remaining 5-inch guns will be mounted behind shields on the spar deck, one forward and one aft. Four 6-pounders will be mounted on the main deck, two forward and two amidship, and four more on the spar deck. The two 1-pounder guns will be mounted aft on the main deck, and the Colt machine guns on the top of the hammock berthing amidship.

The coal capacity of these ships with bunkers full (700 tons) is sufficient to give them a radius of action at full speed of about 2,600 miles. At the most economical rate of steaming, probably in the neighborhood of 10 knots, they will be able to steam about 9,800 miles without re-coaling, or more than sufficient to take them from San Francisco to Manila. The ammunition supply will be large, as it should be to make rapid-fire guns effective. For each of the 5-inch guns, they will carry 250 rounds, and for each of the 6-pounders, 500 rounds.

The wood material used in the construction of the hulls will be reduced to a minimum. All the bulkheads on the gun and berth decks will be of metal, and they will each be fitted with a pilot house on the spar deck built entirely of non-magnetic metal. Where it is necessary to use wood for any purpose, it will be treated with the electric fireproofing process before being worked. A watertight deck covered with ½-inch plate will be worked from stem to stern, the sides sloping down to 3 feet below the water line, and the flat or midship portion rising 18 inches above the same. This will be on the line of the berth deck for the greater part of the length, but toward the ends it will slope down. On top of the watertight deck at the sides a belt of obdurating material will be worked, covering the water line for the whole length of the ship. All of the propelling machinery, steering gear and magazines, will be below the watertight deck.



DENVER AND CLASS, SIX UNPROTECTED CRUISERS FOR WHICH THE UNITED STATES GOVERNMENT WILL SHORTLY LET CONTRACTS.

The rig will be two-masted schooner with signal yards on the foremast. Each vessel will have two search lights, an electric signalling system and a complete installation of electric lights. The blowers for ventilation and deck winches will be operated by electricity. Each ship will carry one 30-foot steam cutter, one 30-foot launch, two 28-foot cutters, two 26-foot cutters, one 28-foot whaleboat gig, one 28-foot whaleboat, and one 18-foot dingy. The complement will be 27 officers, 238 seamen and 25 marines.

Robert B. Wallace, son of Robert Wallace and brother of General Manager James C. Wallace of the American Ship Building Co., graduated from the Boston Institute of Technology, a few days ago, and has entered the employ of the ship building company at the Lorain plant. Mr. Wallace was one of a class of eight graduates in naval architecture and marine engineering. It is quite probable that places would have been found for all these young men in the navy department, if they were desirous of entering the employ of the government. One of them goes to the Brooklyn navy yard, three found places with the Newport News Ship Building & Dry Dock Co., and two go to the Maryland Steel Co. of Sparrow's Point, Md. Mr. Wallace says that the number of young men at the Boston school who are taking the naval architecture course is increasing of late. There will probably be twelve graduates next year. He derived considerable advantage from a trip through European ship yards a year ago, and has been in touch for some time past with the work of the great lakes.

DEVELOPMENT OF AMERICAN SHIPPING.

A REVIEW OF THE MORE IMPORTANT EVENTS OF THE PAST YEAR AS REGARDS BOTH NAVY AND MERCHANT MARINE—CROWDED SHIP YARDS IN ALL PARTS OF THE COUNTRY—AMERICA THE FUTURE RIVAL OF GREAT BRITAIN AS A SHIP BUILDING AND SHIP OWNING NATION.

(FROM THE BLUE BOOK OF AMERICAN SHIPPING, JUST FROM THE PRESS. PUBLISHED BY THE MARINE REVIEW PUB. CO., CLEVELAND.)

No single year in the third of a century that has been consumed in the development of iron and steel ship building in the United States has witnessed progression as rapid, or the introduction of innovations as numerous or radical, as that which has elapsed since the last issue of the Blue Book of American Shipping. American triumphs in the foreign trade field are gradually convincing the people of the whole country that the development of our shipping interests is not a matter that concerns only the ship builder or ship owner.

In the naval field recognition must be accorded to many of the more important events of the Spanish-American war, with their lessons on the importance of fire-proof wood, the necessity for adequately-equipped repair ships as adjuncts to all sea squadrons, and the provision of regularly constituted military transports. The experiences of the war have also brought to the attention of the naval architect and the marine engineer timely problems, the solution of which, by discussion, may prove quite as invaluable as the demonstration of other truths by actual warfare. Thus we have the last meeting of the American Society of Naval Architects and Marine Engineers concerning itself chiefly with the field of usefulness of the torpedo boat, the destroyer and the monitor, just as the Bourgogne and Mohegan disasters will make the subject of launching and manning life boats at sea the topic of paramount interest at the next gathering of this representative American organization. Rear Admiral Melville has carried his idea of triple-screw propulsion into the foreign field, where it is now received with skepticism rather than indifference, and our engineer force has declared that if the battle of Santiago taught nothing else, it certainly made very clear the absolute necessity of water-tube boilers for our modern war vessels. Finally the United States navy department has gone forward with the consummation of the most extensive naval program it has ever undertaken and congress has authorized the adoption of an even more extensive one for fulfillment during the next two or three years.

The development of the American mercantile marine and the American ship building industry have gone forward hand in hand, both stimulated by the greater industrial activity following the Spanish-American war, the ship building industry benefited especially by the severe drain made by government purchases of available tonnage for the auxiliary naval fleet. The report of the commissioner of navigation for the treasury department fiscal year, ended June 30, 1899, will show a growth unprecedented in the history of ship building in this country, and the figures for the year just opening will be even more interesting. There are now building in our ship yards for the United States and foreign countries more than fifty naval vessels, valued at upwards of $40,000,000, exclusive of armor and armament, and more than 200 merchant vessels (no small craft of any kind included), the aggregate value of which exceeds $30,000,000.

There has been turned out in this single year an Atlantic coast fleet of respectable size, in which the Cromwell, Morgan, Ward, Merchants & Miners, Old Dominion, Plant, Old Bay, and almost all other principal coast lines, have been represented. For Pacific coast service there are building more modern steel freight and passenger steamers than have been constructed in any three previous years combined. On the western rivers steel hulls have made their appearance, with promise of the river fleet being gradually rebuilt along steel lines. The ship yards of the entire country have, in fact, orders sufficient on hand to keep them in operation for periods ranging from one to three years. The largest merchant vessels and vessels of war ever constructed on this side of the Atlantic are now on the stocks in American yards. The principal steamship companies of the country has been compelled to place orders abroad by reason of inability to secure from any American builder a promise of delivery in anything like the time required. All the yards, great and small, are developing and expanding. At Newport News, Va., alone, the improvements under way will entail an expenditure of $2,000,000. A $3,000,000 ship yard is in process of establishment on the Delaware and another with a capital of $1,000,000 is projected. The Maryland Steel Co. reopened its marine plant in obedience to a rush of work that enabled it to, six months later, have seven steel steamers under construction. Southern energy embodied in the William R. Trigg Co. converted Richmond, Va., into a ship building port. The general extension of the use of pneumatic tools in the construction of steel vessels is a feature of the year's progress, as is also the more extended introduction of cantilever cranes and other equipment calculated to reduce costs by facilitating ship yard operations.

On the great lakes all the leading ship building and dry dock plants have been merged into the American Ship Building Co., one of the strongest of the recently-formed industrial organizations, with a conservative policy, well defined, and with complete control still in the hands of the men who built up this industry in the lake region. This company already has in hand several orders for freight carriers of 9,000 net tons capacity on 18 feet draught, that are not to be delivered until May, 1900, but on which work must begin immediately, as they are to cost approximately $350,000 each, and with quadruple expansion engines and water tube boilers will represent the best practice that is to be found in ship building anywhere in the world. A total value of about $6,000,000 is represented by all new tonnage now under way in ship yards of the great lakes, and there is every reason to expect that this aggregate will be kept up for a couple of years to come, notwithstanding the higher values now prevailing in labor, material, and supplies of all kinds. In short, it is the general opinion that under the influence of powerful corporations now controlling transportation affairs on the great lakes practically the entire fleet is to be rebuilt on lines of the modern steel vessel.

The Cramps, of Philadelphia, and the Union Iron Works, of San Francisco, have completed the first war vessels for foreign powers turned out from American ship yards in many years. The American "tramp" steamer has made its appearance. New England districts are again witnessing quite a little activity in the construction of wooden vessels, even to the placing of an order for a six-masted ship that is to carry 5,500 tons dead weight. In this line of diversity may be mentioned also the light-draught, stern-wheel type of steamer, which has been constructed in quite large numbers on both coasts for service in shallow Alaskan waters; and on the great lakes the steamer of about 3,000 tons capacity on 14 feet draught, which is suited to special trade on the lakes, or may be transferred through the Welland and St. Lawrence canals to the Atlantic, where there is promise of profitable trade for a long time to come, not only between ports on the eastern seaboard but also between New York, Cuba and Porto Rico.

Progress in the construction of pleasure craft has not been less rapid. The Bath Iron Works, Bath, Me., completed recently the most powerfully engined steam yacht ever constructed for a private owner, and a summary of the year's orders shows almost two score steam yachts ranging from 60 to 303 feet in length completed or under construction in American yards. The construction of the Columbia by the Herreshoffs for the international cup races of the fall of 1899 indicates the general interest still shown in sailing craft, and the success of the great Russian ice crushing steamer Ermack, constructed in England, marks the further advance of a distinctively American idea.

Plans have been made which will place at least a few American dry docks, both floating and stationary, at the head of the world's structures of this character. The great timber dry dock now building for the Newport News Ship Building & Dry Dock Co., at Newport News, Va., will so far surpass all others of its class that two ordinary naval vessels can be accommodated therein simultaneously, while the floating dry dock for the government to be stationed at Algiers, La., will surpass those other products of its designers' skill, the Stettin and Havana docks.

An event of first importance during the year has been the introduction in congress of the Hanna-Payne bill, destined to secure the adoption of a system of ship subsidies, the plan, which in the opinion of all well informed shipping men, offers the surest solution of the problem of restoring our merchant marine to its former position on the seas of the world. This measure, as well as the Nicaragua canal bill, would have been given fuller consideration in the last congress but for the war disturbances. It will undoubtedly be taken up early in the next session. No definite action on the Nicaragua canal question can be taken for some time, as it will be necessary to await the report of a new commission, authorized at the close of the last congress, and which is empowered to investigate not only the Nicaragua but the Panama and any other possible route, and report as to which is the most feasible to construct and operate.

Projects for extensive river and harbor improvements have had the support of such able statesmen as Mr. Frye in the senate, and Chairman Burton, of the rivers and harbors committee in the house, and consequently appropriations have been on a commendable scale of liberality. Particularly has this been gratifying in so far as it insures a much needed radical improvement of New York harbor. Appropriations for the conduct of other departments of the government having to do with the navy and merchant marine also indicate a broad progressive spirit. At the various navy yards extensive purchases of tools and machinery will be made, and four new dry docks, two of stone and two of timber, have been authorized. The light-house and life saving services will both benefit in efficiency, and the revenue cutter service, after rendering valuable assistance in the Spanish-American war, finds itself better equipped—at least on the Atlantic coast—than at any time in years.

Finally the United States has learned much from the foreign ship builder and his kindred artisans, and seemingly the British ship builder is ready to accord more attention to the trend of events in this country. An American firm recently furnished to Belfast builders a large consignment of ship plate for the Oceanic, the largest vessel ever constructed, and the British technical journals are universal in the concession that in America is to be found the future rival of Great Britain as a ship-building and ship-owning nation.

STEAM YACHT ARIA.

One of the trimmest steam yachts that has been constructed at an American yard in this year of activity in steam yacht construction will be ready for delivery to Edward H. Blake of Bangor, Me., by the Gas Engine & Power Co. and Seabury & Co., Consolidated, of Morris Heights, New York City, in the near future. The Aria, which is a schooner-rigged yacht of high free board, is 145 feet over all, 117 feet water line, 17 feet beam, 10 feet depth and 7 feet draught. She is fitted with a triple expansion engine, to which steam is supplied from a Seabury water tube boiler, and her builders guarantee a speed of 18 knots. The vessel's coal capacity will enable her to steam 1,300 miles at moderate speed.

The deck house—very roomy and finished in mahogany—contains the dining saloon and butler's pantry, which is connected by a dumb waiter with the galley below. Forward of the chain hold, below deck, is a large storage room, next aft the crew's toilet room, then the crew's quarters and mess room. State rooms are provided for the captain and chief engineer. The boiler and engine rooms are aft of the galley. Abaft the engine and boiler rooms and occupying the full width of the vessel is the owner's state room, which is 8½ feet in length. Aft of the owner's apartments is the main saloon, out of which open two guests' state rooms. The vessel is, of course, fitted with everything in the way of modern auxiliary machinery and a general up-to-date equipment.

General regret has been occasioned by the announcement that Maj. Clinton B. Sears, who has been for seven years in charge of government improvements on Lake Superior, has been transfered to Porto Rico, being detailed to establish harbor lines. Maj. Sears' post at Duluth will be filled by Maj. Fiske, who has been stationed at Portland, Ore., but who is known to some extent on the great lakes, having been in charge of the Duluth office for two years prior to his departure for Portland.

PUBLIC WORKS.

ATTENTION IS DIRECTED TO LAWS ASSERTING THE AUTHORITY OF THE UNITED STATES GOVERNMENT OVER ITS NAVIGABLE WATERS—IMPORTANT ADDITIONS FOR THE EFFECTIVE ENFORCEMENT OF THEIR PROVISIONS.

Government engineers and their assistants throughout the country are directing attention to the laws relating to interference of any kind with public works. The river and harbor act approved March 3, 1899, reasserts the authority of the United States government over its navigable waters by the re-issue of former laws in a more extended and clearer form, with some important additions for the more effective enforcements of their provisions. An epitome of the special sections referring to this subject is as follows:

Section 9 makes it unlawful to construct bridges, dams, etc., except upon consent of congress and approval of plans by secretary of war.

Section 10 makes it unlawful to create any obstruction not affirmatively authorized bv congress, to the navigable capacity of any of the waters of the United States; to build any wharf, boom, bulkhead or other structure outside of established harbor lines or where no harbor lines have been established except upon authority of secretary of war; to excavate or fill or in any manner to alter or modify the course, location, condition or capacity of any waters of the United States unless the work has been authorized by secretary of war.

Section 11 provides for the establishment of harbor lines by the secretary of war and for the principle of tidal compensation in tidal waters.

Section 12 provides penalties for violating the foregoing sections in a fine of not more than $2,500 nor less than $500, or by imprisonment not exceeding one year, or by both. Also for the removal of any structures erected in violation by injunction of the circuit court.

Section 13 makes it unlawful to throw, discharge or deposit from any floating craft, of from the shore or wharf, any refuse matter of any kind whatever, other than that flowing from streets and sewers passing therefrom in a liquid state, into any waters of the United States. Also to place such material on the banks where it will be liable to be washed into such waters either bv tides, storms, floods or otherwise. This section provides also that secretary of war may permit such deposits under certain conditions, if application is previously made.

Section 14 makes it unlawful for any person or persons to harmfully use or occupy any work built by the United States, whether wharf, jetty, survey station, buoy, water gauge or other property.

Section 15 makes it unlawful to tie up or anchor in navigable channels so as to prevent or obstruct passage of vessels; or to carelessly sink vessels or other crafts in channels; or to float timber or logs so as to impede navigation. It also provides that whenever a vessel or other craft is sunk accidentally or otherwise, the owner shall immediately mark it by a buoy and lantern until the wreck is removed or abandoned; also that the owner shall begin the immediate removal of the wreck, otherwise it will be considered to be abandoned and subject to removal by the United States.

Section 16 provides penalties for violation of sections 13, 14, and 15, the same as in section 12. Also that any master, pilot or engineer who shall engage in towing any material in violation of section 13, or who shall injure or destroy any work or property of the United States, or who shall obstruct the channels, shall be further punished by having his license revoked or suspended. Also that the vessel employed in such manner shall be liable for the penalties and damages.

Section 17 provides that the department of justice shall conduct the necessary legal proceedings, and that the district attorneys shall vigorously prosecute. Also that the officers and agents of the United States in charge of river and harbor improvements, and the assistant engineers and inspectors employed under them, and the collectors of customs and other revenue officers shall have power and authority to swear out process, and to arrest and take into custody, with or without process, any person who may violate any of the provisions of the law. Summary arrest without process may only be made when violation of law is in the presence of the officer, and the prisoner must be taken immediately before a commissioner, judge or court.

Section 18 provides that whenever the secretary of war shall have good reason to believe that any bridge now constructed or which may hereafter be constructed, is an unreasonable obstruction to free navigation, on account of height, width of span or otherwise, or where there is difficulty in passing the draw opening, the said secretary of war may compel the alteration of such bridge within a certain time and upon failure to make the required changes in the specified time, the owners of the bridge are liable to fine of $5,000 and to the same for each month the obstruction remains.

Section 19 provides that when a channel shall be obstructed by a sunken vessel for longer than thirty days, or when such vessel shall be abandoned in less time than thirty days, the secretary of war may remove it without liability to owners.

Section 20 provides that in emergency, when a sunken craft shall specially endanger or interfere with navigation, the secretary of war or his agents may take immediate steps for its removal or destruction, the expense to be a charge upon the vessel and cargo.

Mr. Wm. T. Blunt, United States Assistant engineer, in an interview upon the subject of the laws says: "The effects of the law are far reaching and it is evident that congress has awakened to the necessity of protecting the works which are constructed under its authority. In the past, the law itself may have been stringent but the provisions for its enforcement have been so hedged about by legal technicalities that conviction has been seldom practicable. As a general thing, marine men are law abiding citizens, but occasionally one has been found who considered United States laws as good jokes only, and who knew that conviction was so uncertain that the authorities hesitated to enter upon the prosecution. The authority for summary arrest without process, is one which should be very carefully used, but it is one which will, without doubt, have a wholesome effect upon those who would otherwise take long chances on the more tedious and uncertain methods formerly in force, when complaint and proof was required to pass through many official hands before the formality of arrest and hearing could be reached. Masters, pilots and engineers will now think twice before they tow a load of material to be deposited in the water, at any other place than where authorized by the United States authorities, and also before they consent to scuttle and abandon a wreck in mid stream. The owner of a sunken vessel is now compelled to keep her marked by a buoy and light until he abandons her when the United States may remove her without liability. Vessel masters will under this law be held strictly accountable for unreasonable or careless destruction of buoys, or other marks used for public purposes. Bridges whose narrow draw-ways or decayed pieces make them a menace to passing boats, may be complained of with assurance that this new law authorizes the United States to compel their reconstruction to suit the present needs of commerce. I believe that in the future as in the past, we may look to the marine interests for assistance in protecting river and harbor works, but the law is now so clearly defined that there can be no transgression from it without danger of suffering the penalties."

STEAMER CHINA IN DRY DOCK.

Harland & Wolff, the Belfast ship builders, seem to have taken certain precautions that will interest other owners of dry docks in preparing for repairs on the steamer China of the Peninsular & Oriental line, which was released from Azalea rock at the mouth of the Red Sea after being stranded for some months. It was impossible to resort to ordinary methods of dry docking, because of the condition of the steamer's bottom. Although divers worked on the vessel for some time previous to her release from the rocks, little was known regarding the condition of her bottom, beyond the fact that for a considerable portion of her length the keel and bottom plates were in anything but normal condition. Before the docking operations were undertaken, it was decided to carry the weight of the fore end of the ship on square timber logs of about 20 inches measurement, taken horizontally through the vessel from side to side. For this purpose holes of sufficient size had to be cut through the side plates and no fewer than sixteen of the logs were "rove" through the China, and under the projecting ends upright timber supports 16 to 18 inches square were fitted. These latter rested upon shoes on the bottom of the dock, to which they were secured by braces, while the heels of the logs were strapped round as a precaution against splitting. Of course all uprights had to be cut before the ship entered the dock and positions marked on the bottom of the dock for shoes to sit upon.

After the vessel had been floated in and the water was leaving her, the uprights, the heels of which had been placed in position and kept down by heavy pig iron loading, were carried into the sides of the ship and kept fair for taking the weight, as the vessel gradually settled with the regression of the water. A large number of timber shores were fitted to assist the supports. A number of the latter were carried up from the bottom of the dock as uprights while others were on various altar courses or step sides of the dock and so cut at the head as to take an angle plate which fitted close up under the edges of the overlapping shell plates. These shores were angled out at the heel, thereby increasing their effectiveness. Altogether there were three rows of these supports, consisting of square pitch pine logs of from 12 to 18 inches measurement.

The examination which was permissable after the water had been pumped out of the dock showed the condition of the ship to be remarkable. For a distance of fully 220 feet from the stern the bottom of the ship was driven out of shape. From the turn of the fore-foot the keel was arched for nearly 200 feet, being set up 9 or 10 feet. The plates were corrugated and dented in a most remarkable manner. Despite the heavy damage, only about fifty rivet holes had to be plugged. The keel, which by the way is of the slab type, 10 inches by 4 inches, is not broken. The damage to the vessel was not confined to the forward end, there being a few indented and slightly fractured plates 150 feet from the stern on the starboard side.

THE IRON ORE PROBLEM.

Under the above head the London Statist of recent date says:

"The world's output of pig iron in 1898 is computed at 35,000,000 tons. That, on the usually accepted basis of 2 tons of ore to 1 ton of pigs, represents 70,000,000 tons of ironstone. Are the known resources of the producing countries equal to a continuous drain on that scale? But the output of pig iron this year—if America reaches her 14,000,000 tons, Great Britain makes up for the Welsh stoppage of last year and more, and Germany continues at present rate—will be, say, 38,000,000 tons, which represents 76,000,000 tons of ore. As a matter of fact, however, more than 2 tons of ore must be reckoned to 1 ton of pig iron, for while we absorbed, as shown above nearly 20,000,000 tons of ore last year, we only produced 8,631,151 tons of pig iron. Of course there were stocks of ore on hand, in transit, and in process included in the reputed consumption, and not represented in the returned output of pigs, but with all allowance for that, the 2 to 1 measurement is not sufficient. For the anticipated make of pigs, then, at least 80,000,000 tons of ore will be needed. Where is it to come from? Last year the United States mines produced 23,000,000 tons, the Spanish mines 7,000,000 tons, the German mines, say, 16,000,000 tons, the British mines 14,000,000 tons—in all, 60,000,000 tons. America, Great Britain and Germany alone consumed 56,000,000 tons last year, and this year will need at least 65,000,000 tons if the promised production is to be effected. The problem is to supply that quantity, and of quality adapted to existing plant. That there are undeveloped resources in Spain is not to be denied, but development takes time, and is a matter of cost, which, of course, becomes greater the further the deposits are from the sea-board. That our home supply can be materially increased is very doubtful—unless, at any rate, iron attains to a permanently higher level than at present. That the reserves of the United States are practically inexhaustible we are all accustomed to think, but the utilisation of these reserves is all a question of price. Our own belief is that nowhere can the supplies of ore be so increased this year as to enable the estimated quantity of pig iron to be smelted. The future supplies can be increased, but will only be increased if the price of iron is maintained at a considerably higher level than in recent past years. In other words, we have entered upon an era of dearer iron, when instead of forties, consumers will have to reckon with pigs in sixties, if not in seventies."

WHERE SHIP BUILDERS ARE BUSY.

One of the most successful of all launches at the Roach ship yard was that of the steel steam yacht Idalia, designed by Gardner & Cox of New York City, and building for Eugene Thompkins of Boston, Mass. The new yacht is 186 feet in length, 140 feet load water line, 20 feet beam, 12 feet 10 inches depth and 10 feet draught. The machinery consists of a triple expansion vertical engine with four cylinders, 12½, 20, 22½ and 22½ inches cylinder diameters and 18 inches stroke. Steam will be supplied from four Almy water tube boilers. The yacht, which will have a speed of 17 miles an hour, will be completed in a couple of months and will cost $80,000.

Thomas McCosker & Co. of Baltimore, Md. will build a wooden tug 95 feet in length, 20 feet beam and 10½ feet depth. She will have a steeple compound engine with cylinders of 12 and 24 inches diameter and 20 inches stroke, and the boiler will carry 140 pounds of steam.

Neafie & Levy, Philadelphia, Pa., will build for Philadelphia parties two powerful steel tugs, each 150 feet in length, 17½ feet beam and 16 feet depth of hold. Triple expansion engines will be fitted.

E. H. Hanson of San Francisco and C. X. Larabee, president of the Fairhaven Land Co., are going forward with their project for the establishment of a ship yard at Fairhaven, Wash.

Moran Bros. Co. of Seattle, Wash., will probably build the ferry boat recently designed for service on Lake Washington, Wash. Their bid of $22,800 was the lowest submitted.

Next Saturday is the date set for the launch of the Morgan liners El Rio and El Amico, now on the stocks at the yard of the Newport News Ship Building & Dry Dock Co.

Jones & Laughlins, Limited, of Pittsburg, will build another new towboat. The firm now has the towboat Vulcan under construction at Marietta, Ohio.

The new steam pilot boat to be built for the Delaware River Pilots' Association will be considerably smaller in size than the present boat, the Philadelphia.

The Canadian Canoe Co. of Peterborough, Ont., has almost completed a handsome little steam yacht for Wm. Snodgrass & Son of British Columbia.

The Monongahela & Ohio Transportation Co. of Pittsburg, Pa., will probably built a new steamer for excursion business.

As an indication of the manner in which ore is being rushed down the lakes just now, it is noted that in eleven hours of one day last week twelve cargoes were loaded at the docks of the Duluth, Mesabi & Northern Ry., Duluth, Minn.

ITEMS OF INTEREST.

The Hilles & Jones Co., Wilmington, Del., last week shipped a large steam punch and other heavy machine tools to Hull, England.

Some of the wooden vessels, which are not as liable to bottom damages as the big steel "fellows" in connecting channels of the great lakes, are now loading very close to 18 feet when bound to or from Lake Michigan.

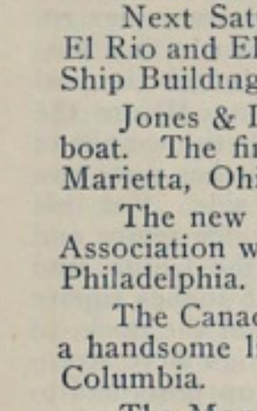
The organization of the West Bay City Ship Building Co., with a capital of $500,000, announced from Michigan a few days ago, is for the purpose of facilitating the transfer of the Wheeler plant at West Bay City to the American Ship Building Co.

A booklet has been received from the Knecht Bros. Co of 2442 Beekman street, Cincinnati, describing their friction sensitive drill for use in machine shops and manufactories. In good, easy reading the details of its construction are described, and a very convincing argument is given for its use.

A plant for the manufacture of the Thew steam shovel, illustrated in this issue, in connection with a description of Conneaut ore docks is to be erected at Lorain, O., and the Thew Automatic Steam Shovel Co. is in the market for equipment. The company will buy a boring mill, several large lathes, a horizontal boring mill, two planers, shapers, milling machines, two large radial drills, steam hammer, engine, line shafting, generator and motors, electric lighting equipment, a 25-ton electric traveling crane. Address Capt. Richard Thew, 10 Wade Bldg., Cleveland, or F. A. Smythe, Lorain Foundry Co., Lorain, O.

Previous to the consolidation of lake ship yards, the American Steel Barge Co. of West Superior (now Superior Shipbuilding Co.) had a contract with the Bessemer Steamship Co. for the construction of a very large steel steamer and two steel barges to be delivered in the spring of 1900. This contract was, of course, taken over by the consolidation, and there has been some question therefore as to whether all three of the vessels would be built at the head of the lakes or arrangements made so that a part of the work might be done at one of the lower lake yards. It is now quite probable that the two barges will be built at the head of the lakes and the steamer at the Globe works, Cleveland.

Vessel men who anticipate attending the international yacht races off Sandy Hook next October will be pleased to learn that editor George L. Norton of the Marine Journal, New York, will conduct the excursion runs of the handsome Plant line steamer La Grande Duchesse to these races. The Marine Journal has on the occasion of several previous international races been associated with President Plant of the Plant system in the management of special excursions, which have proven very popular, and there is every reason to anticipate that this year's event will prove even more enjoyable than any of its predecessors, as the Grand Duchesse will be the largest steamer in the fleet that will follow the racing yachts. A first class caterer and a band and orchestra will be provided. Reservations of passage may be had by addressing Capt. Norton at 17 State street, New York.


OPEN.

"KEYSTONE" OPEN LINK.

IT IS THE ONLY OPEN LINK ON THE MARKET THAT IS

DROP FORGED FROM BAR STEEL.

For STRENGTH, DURABILITY and SIMPLICITY

IT STANDS WITHOUT A RIVAL

Sizes from ¼ in. to ⅝ in.

KEPT IN STOCK.

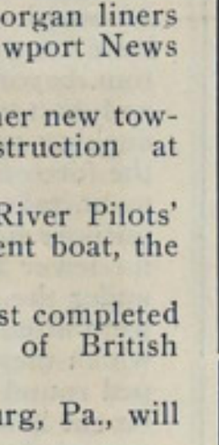
STANDARD Wrenches, Hoist Hooks, Eye Bolts, Shafting Collars, Machine Handles, Thumb Nuts, Thumb Screws, Rope Sockets and Swivels, Fence Ornaments, Bicycle Forgings, &c.

SEND FOR CATALOGUE AND DISCOUNTS

SPECIAL FORGINGS TO ORDER.

KEYSTONE DROP FORGE CO.,

19th & Clearfield Sts. PHILADELPHIA, PA.


CLOSED.

A Rare Opportunity

IS OFFERED FOR A

Small Summer Steamer

to ply around different points of interest in the vicinity of Marquette, Mich., during tourist season. Every facility will be offered for the establishment of a profitable business.

Address W. B. H., Office Marine Review Pub. Co.,

June 15. Perry-Payne Building, Cleveland.

ONE OF THESE BINDERS

that will hold 52 NUMBERS of the

MARINE REVIEW,

Will be mailed to any address on receipt of $1.

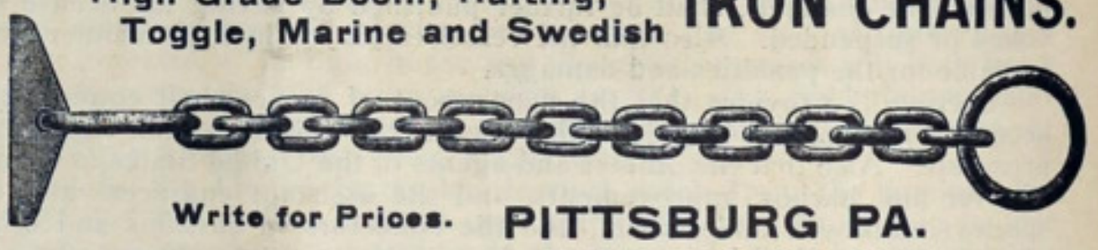
MARINE REVIEW...

Perry-Payne Bldg., CLEVELAND, O.

JAMES McKAY & CO.

Manufacturers of all kinds of

High Grade Boom, Rafting, Toggle, Marine and Swedish IRON CHAINS.



Write for Prices. PITTSBURG PA.

Treasury Department, Office of General Superintendent U. S. Life-Saving Service, Washington, D. C., June 10, 1899. Sealed proposals will be received at this office until 2 o'clock p. m. of Wednesday the 5th day of July, 1899, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1900; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quanties named in the specifications. The supplies needed consist of Beds and Bedding; Blocks and Sheaves; Cordage; Crockery; Furniture; Hardware; Lamps, Lanterns, etc.; Lumber, Medicines, etc ; Paints, Oils, etc.; Ship Chandlery, Stoves, etc.; Tools, and Miscellaneous articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 17 State Street, New York City; Superintendent Eleventh Life-Saving District, Grand Haven, Mich.; and Superintendent Twelfth Life-Saving District, New Appraisers' Stores, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C.," and marked on the outside "Proposal for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects, if deemed for the interests of the Government Horace L. Piper, Acting General Superintendent. June 22.

FOR SALE.

Pleasure steamer Helen. Length 61 feet, width 12 feet, and depth 6 feet. One fore-and-aft compound condensing engine of 7½ and 12 inches cylinder diameters; 200 pounds steam. H. HOUGHTEN, 806 Hammond Bldg., Detroit, Mich.

CLEVELAND TERMINAL & VALLEY RAILROAD COMPANY.
"B. & O. System."

Invites the attention of the traveling public to their new through service recently inaugurated.

Train No. 9: New fast train leaving Cleveland 3:25 P. M. daily for Pittsburg, Washington, Baltimore, Philadelphia and New York, carrying elegant coaches, Pullman vestibule sleeping cars to Philadelphia and Royal Blue dining car from Washington at 7:00 A. M.

Train No. 5: Night express for Akron, Canton and Chicago, leaves Cleveland daily at 10:00 P. M. with coaches and Pullman vestibule sleeping cars and dining car into Chicago, arriving at 9 o'clock next morning.

Train No. 47: For Akron, Canton and Chicago, leaves daily as heretofore at 6:35 P. M., carrying through coaches and Pullman sleeping car into Chicago, arriving at 7:00 A. M.

Lowest rates to Chicago, viz: First-class, $8.50; second-class, $7.00.

OTHER TRAINS ON C. T. & V. R. R.

	Depart.	Arrive.
Valley Junction and way stations.....	7:25 A. M.	6:25 P. M.
Wheeling and Chicago	7:25 A. M.	9:25 P. M.
Akron, Canton and Wheeling.....	3:25 P. M.	10:20 A. M.
Akron, Canton and Marietta.....11:00 A. M.		2:10 P. M.

City ticket office, No. 241 Superior street.
Depot foot of South Water and Champlain streets.

J. E. GALBRAITH, Traffic Manager.

HOW TO REACH SEASHORE, MOUNTAIN AND LAKE RESORTS

The Pennsylvania lines extend direct to places of summer sojourn along the Atlantic ocean. Atlantic City, Cape May, Asbury Park, Long Branch and resorts on the New Jersey coast are seashore terminals of the Pennsylvania system. Newport, Narragansett and summer havens in New England are reached over the Pennsylvania route via New York. The Adirondacks, White Mountains, Catskills and mountain retreats of the east are also reached through New York. Resorts in the Alleghenies are located upon the Pennsylvania route and may be reached via Pittsburgh without changing cars. The Pennsylvania lines also lead to resorts in Michigan and the lake region through three gateways—Cleveland, Toledo and Fort Wayne. Full information about rates, through time of trains and the convenient manner in which summer resorts may be reached will be cheerfully furnished upon application to local passenger and ticket agents of the Pennsylvania lines, or by addressing

C. L. KIMBALL, A. G. P. Agt., Cleveland, O.

Officials of the Cleveland & Buffalo Transit Co. are highly pleased with the recent fast run of their side-wheel steamer City of Erie, between Cleveland and Buffalo. It is said that the average speed for the entire distance was 21¼ miles an hour, and from Dunkirk to Buffalo, a distance of thirty-seven miles, the Erie is said to have made 22 9-10 miles an hour. On the entire trip she averaged 28½ turns a minute, while on the run from Dunkirk to Buffalo she made 30 turns.

A SPECIALTY: TOWING LINES AND SHIPS' HAWSERS

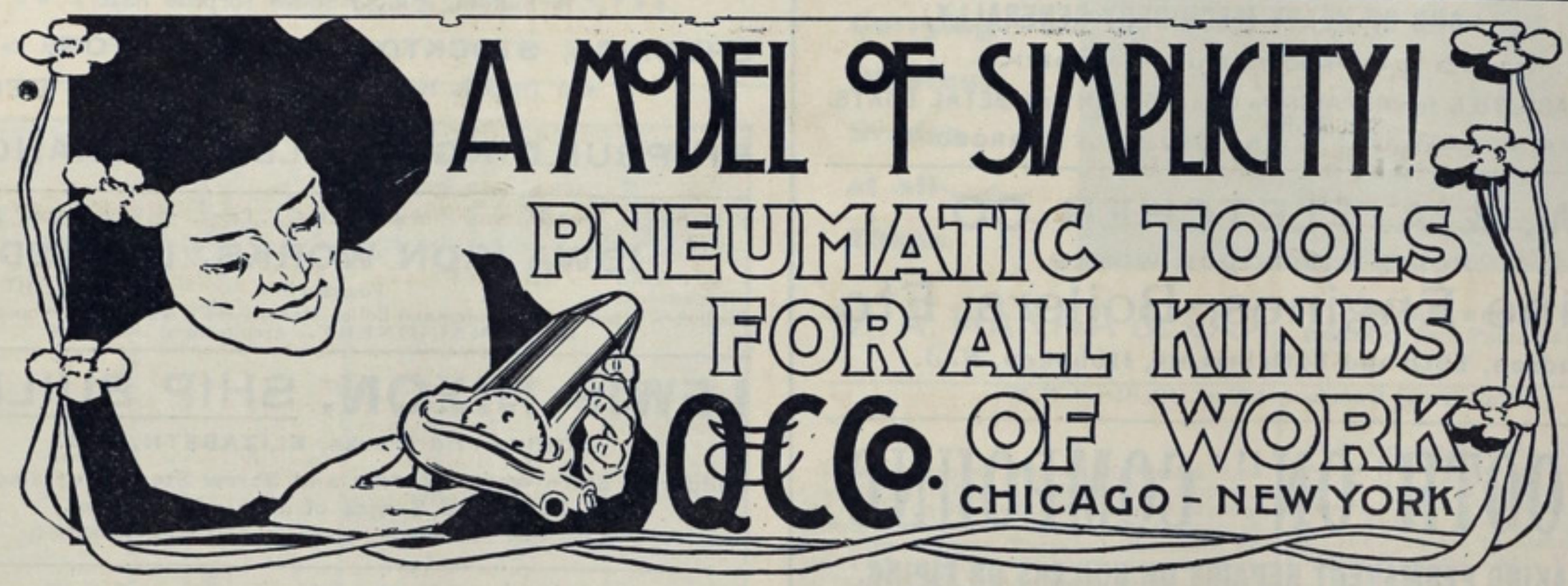
ROPE

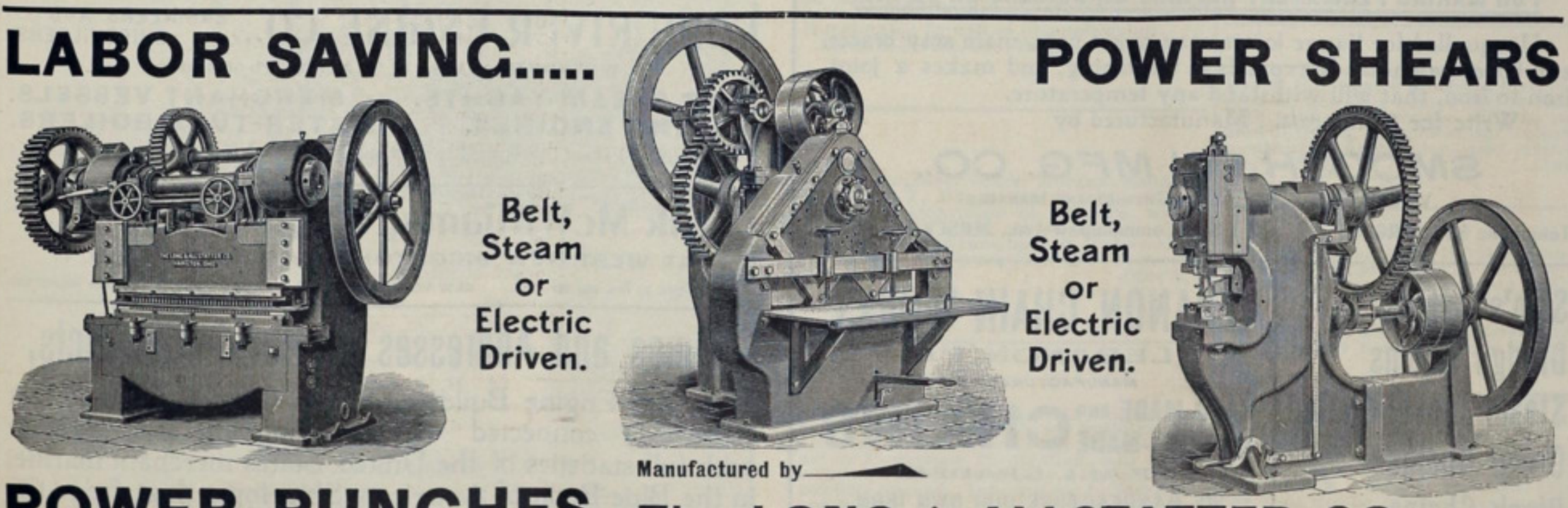
THE AMERICAN MANUFACTURING CO.

67 WALL STREET, NEW YORK.

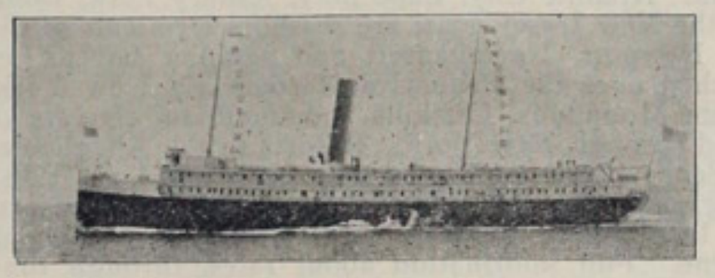
THE LARGEST MANUFACTURERS OF FIBER IN THE WORLD.

A SPECIALTY: 4-STRAND PLUMBAGO HEART HOISTING ROPE FOR CARGO FALLS





ROACH'S SHIP YARD.



DELAWARE RIVER
IRON
SHIP-BUILDING & ENGINE WORKS,
CHESTER PA.

Builders of Steamships and Marine Machinery.

SHIP-BUILDING IN ALL ITS BRANCHES.

New York Office, Morgan Iron Works, Foot East Ninth St

Newport News Shipbuilding & Dry Dock COMPANY.

WORKS AT NEWPORT NEWS, VA.
(On Hampton Roads.)

Equipped with a Simpson's Basin Dry Dock capable of docking a vessel 600 feet long, drawing 25 feet of water, at any stage of the tide. Repairs made promptly and at reasonable rates.

SHIP AND ENGINE BUILDERS.

For estimates and further particulars, address

C. B. ORCUTT, Pres't,
No. 1 Broadway. New York.

The Pusey & Jones Company,

WILMINGTON, DELAWARE.

Builders of IRON AND STEEL STEAMERS, STEAM YACHTS, TOW BOATS, MARINE ENGINES, BOILERS, TANKS, AND OF HEAVY MACHINERY GENERALLY.

ALSO COPPERSMITH WORK.

SPECIAL FACILITIES for REPAIRS to both WOODEN and METAL BOATS.

MARINE RAILWAY. NO WHARFAGE CHARGED.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

Marine Engines, Boilers, Etc.

Hudson, 12th and 14th Streets, Hoboken, N. J.

Take Ferry from foot of West 14th Street, N. Y

"SMOOTH ON" COMPOUND.

FOR MAKING PERMANENT REPAIRS ON BOILERS OR PIPING.

Unequalled for flange joints, stay screw nuts, main stay braces, end boiler patches. It expands in hardening, and makes a joint, iron to iron, that will withstand any temperature.

Write for Catalogue. Manufactured by

SMOOTH ON MFG. CO.,

VREELAND TOMPKINS, Chemist and Manager

Telephone 804 BERGEN. 547 Communipaw Ave., JERSEY CITY, N. J.

Ship's Cables
Dredge Chains
Steam Shovel Chains
Crane Chains
Block Chains

LEBANON CHAIN WORKS,

LEBANON, PA.

MANUFACTURERS OF

HAND-MADE AND MACHINE-MADE **CHAINS**

OF ALL GRADES.

WE MANUFACTURE OUR OWN IRON.

All our Chains are tested. High Grade Chains a Specialty

THE HARLAN & HOLLINGSWORTH CO.,

SHIP BUILDERS, DRY DOCKING, REPAIRING AND OUTFITTING.

(3-4 CENTURY EXPERIENCE)

WORKS AND MAIN OFFICE, WILMINGTON, DEL.

NEW YORK OFFICE, Exchange Court Building, 52 BROADWAY, ROOM 702.

UNION IRON WORKS

SHIP BUILDERS,

SAN FRANCISCO.

WM. R. TRIGG COMPANY,

SHIP BUILDERS, RICHMOND, VA.

Government Contractors,

Building United States Torpedo Boats

SHUBRICK, STOCKTON and THORNTON,

and Torpedo Boat Destroyers DALE and DECATUR.

SHIPBUILDING IN ALL ITS BRANCHES.

E. M. Dickey, President. Wm. Hopkins, V. Pres't. Eugene P. Kiene, Sec'y.

IOWA IRON WORKS, LIMITED,

Founded 1851. DUBUQUE, IA.

Engineers, Machinists, Founders and Boiler Makers, STEAMBOATS and STEAMBOAT MACHINERY. Architectural Iron Work.

LEWIS NIXON, SHIP BUILDER,

Office and Works, ELIZABETH, N. J.

Builder of Stern-wheel, Paddle and Screw Steamers; also Torpedo Boats and Barges of all kinds in Steel.

A Specialty made of South American and Alaskan River Boats.

FORE RIVER ENGINE CO., ENGINEERS AND SHIPBUILDERS.

WEYMOUTH, MASS., U. S. A. (Suburb of Boston.)

FAST STEAM YACHTS. MERCHANT VESSELS.
MARINE ENGINES. WATER-TUBE BOILERS.

U. S. Torpedo-Boat Destroyers Lawrence and Macdonough now under construction.

Frank McWilliams,

Balance Dry Dock and Ship Yard.
CAPACITY, 2000 TONS.

AT WEST NEW BRIGHTON, STATEN ISLAND, N. Y.

Estimates Given on New and Old Work. NEW YORK OFFICE, NO. 1 BROADWAY. Telephone Connections

---

Names and Addresses of Naval Architects,

Ship and Engine Builders, Vessel Owners, and in fact everybody connected with shipping interests, together with full statistics of the United States merchant marine, in the Blue Book of American Shipping. Just from the press. Marine Review Pub. Co., Cleveland.

Youghiogheny River Coal Co.,

MINERS AND SHIPPERS OF

OCEAN MINE YOUGHIOGHENY GAS AND STEAM COAL

General Office, ERIE, PA. Long Dist. Tel. No. 409.
Shipping Docks, ASHTABULA, O. Long Dist. Tel. No. 76.

VESSELS FUELED at all hours with OCEAN Coal only, by Steam Lighter or Car Dump. Electric Light.

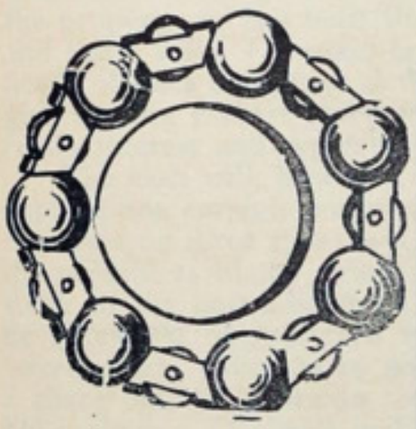
Pickands, Mather & Co.,

FUEL LIGHTERS AT BUFFALO, ERIE, ASHTABULA AND CLEVELAND

At DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.

Best Quality PITTSBURGH COAL furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.



THE

"Cleveland"

A BICYCLE BUILT TO LAST.

Our New BURWELL BALL AND ROLLER BEARING Saves One-Half your Labor.

1899 PRICES:

$35.00, $40.00, $50.00, $75.00

H. A. LOZIER & CO.,

'Phone M. 816. 277-279 ERIE ST.

THE
Swain Wrecking Co.
L. C. WALDO, Pres.
The TUG FAVORITE
STATIONED AT CHEBOYGAN, MICH. WITH COMPLETE WRECKING OUTFIT IN CHARGE OF
Capt. Martin Swain.
THE CANADIAN WRECKER SAGINAW
STATIONED AT DETROIT, MICH. ENABLES US TO WRECK IN CANADIAN WATERS
STEAM PUMPS AND SUB-MARINE WORK IN CHARGE OF
JOHN S. QUINN.
Address all communications to
PARKER & MILLEN.
OFFICE 15 ATWATER ST. WEST
DETROIT, MICH.
FAVORITE
4 STEAM PUMPS, 10 JACKS, 3 HAWSERS.
1 COAL and ORE PUMP
3-12 INCH ROTARY.
1-14 INCH WORTHINGTON.
10-100 TON JACKS
1-12 INCH HAWSER
1-10
1-9
DIVING RIGS AND DIVERS ABOARD AT ALL TIMES
1899 June 1899
SUN. MON. TUE. WED. THU. FRI. SAT.
.. .. 1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 ..
Telegraph
Capt. MARTIN SWAIN
CHEBOYGAN, MICH.
TELEGRAPH
PARKER & MILLEN,
DETROIT, MICH.

The W. L. SCOTT COMPANY, ERIE, PA.

WHOLESALE DEALER IN

SHAMOKIN ANTHRACITE WILKESBARRE COALS YOUGHIOGHENY PITTSBURG MANSFIELD.

VESSEL FUELING A SPECIALTY By STEAM LIGHTER or Car Dump at All Hours. Electric Light.

Main Office, Scott Block, Long Distance Telephone No. 440.
Fueling Office, Canal Dock, Long Distance Telephone No. 320.

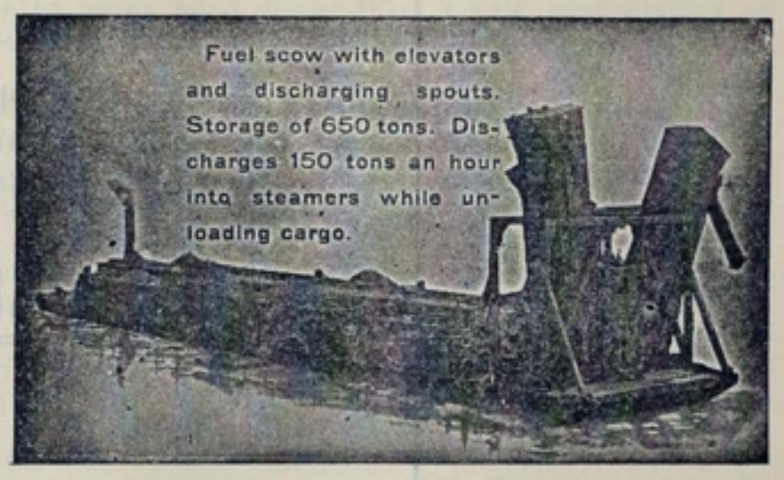
COAL

STANLEY B SMITH & CO.
OPERATING
SMITH'S COAL DOCK
POCKET FUELING AND LOW DOCK.
DETROIT, MICH.
OFFICES: DETROIT MICH.
LORAIN, OHIO.
OPERATING
LORAIN COAL DOCK
LAKE SHIPPERS OF STEAM COAL.
STEAMBOAT FUELING

Steamboat Fuel at Ashtabula,

LARGE SUPPLIES OF BEST QUALITY.

Lighter Carrying Different Grades at all Times.


Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

M. A. HANNA & CO., Miners and Shippers. Main Office, Perry-Payne Bldg., Cleveland.

U. S. Engineer Office, 185 Euclid Ave., Cleveland, O., May 31, 1899. Sealed proposals for dredging in Straight Channel through Maumee River and Bay, and for Constructing Dike between Turn-out Channels, Toledo harbor, Ohio, will be received here until two o'clock, P. M., standard time, Friday, June 30, 1899, and then publicly opened. Information furnished on application.
Jared A. Smith, Col., Engr's. June 29.

U. S. Engineer Office, Morgan Building, Buffalo, N. Y., May 25, 1899. Sealed proposals for harbor excavation at Erie, Pa., will be received here until eleven o'clock A. M. June 26, 1899, and then opened. Information furnished on application. T. W. Symons, Major, Engr's. June 22.

U. S. Engineer Office, Duluth, Minn., June 1, 1899. Sealed proposals for building pile and timber revetments for Ship Canals across Keweenaw Point, Mich., will be received here until noon, July 1, 1899, and then publicly opened. Information furnished on application here, or, at branch office Houghton, Mich. Clinton B. Sears, Major, Engrs. June 22.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., June 12, 1899. Sealed proposals for Repairing Government Piers at Ludington, Mich., will be received here until 3 p. m. June 27, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 22.

U. S. Engineer Office, New Orleans, La., May 30, 1899 Sealed proposals for furnishing steel or iron Tug-boat about 90 feet long, with compound engines, will be received here until 11 a. m. June 30, 1899. Information furnished on application. Geo. McC. Derby, Major, Engrs. June 22.

U. S. Engineer Office, Duluth, Minn., June 6, 1899. Sealed proposals for building extension to breakwater at Presque Isle Point, Marquette, Mich., will be received here until noon, July 6, 1899, and then publicly opened. Information furnished on application. Clinton B. Sears, Major, Engrs. June 29.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., June 8, 1899. Sealed proposals for Removal of part of Wreck of Steamer Horace A. Tuttle at Michigan City Harbor, Ind., will be received here until 3 p. m. July 8, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. June 29.

OUT TO-DAY

BLUE BOOK OF AMERICAN SHIPPING.

(1899 EDITION.)

DIRECTORY OF ALL AMERICAN SHIP OWNERS, SHIP BUILDERS, NAVAL ARCHITECTS AND MARINE ENGINEERS.

INVALUABLE TO EVERY BUSINESS MAN WHO SENDS CIRCULARS TO THE MARINE TRADE.

448 Pages. VALUABLE STATISTICS. 100 Illustrations.

PRICE PREPAID, $5.

MARINE REVIEW PUB. CO., Cleveland, O.